

# Giving an added value to neglected food commodities through their richness in bioactive compounds

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# Five lines of research, all related to the food – health axis

Improvement of milk fatty acid profiles and reduction of methane production



Upgrading of under-exploited foods



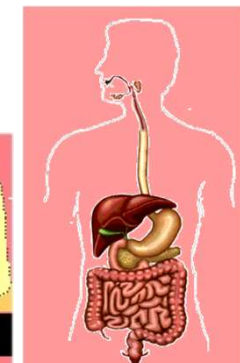
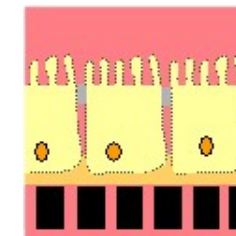
Spectrophotometric methods for food quality control



Dietary alternatives for fish feeding (protein and lipids)



Interaction of drugs and food components with the human gastro-intestinal tract



# **Our research network is working on under-utilized edible plants**

**Plants are said under-utilized in case of under-exploitation of their potential**

**with regard to their potential contribution to**

- food security**
- health benefits**
- economical income**
- environmental impact**

# **Our strategy to discover and give an added value to neglected sources of bioactive compounds:**

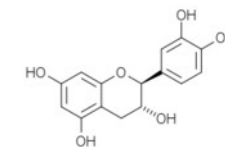
## **1. Selection of promising plant material**

**Based on :**

- existence of a traditional consumption**
- utilisation in folk medicine**

# Our strategy to discover and give an added value to neglected sources of bioactive compounds:

2. **Chemical characterization of potential bioactives**
3. **Evaluation of bio-activities:**  
( *In vitro* and *in vivo* approaches)
  - Antioxidant
  - Anti-inflammatory
  - Anti-atherosclerotic
  - Anti-obesity
  - Anti-cancer
4. **Contribution to product development in companies**
  - foodstuffs
  - food supplements
  - food additives



# A nice example : the açai palm fruit



- Área de concentração da Palmeira *Euterpe oleracea* Mart
- Região do Estuário Amazônico



# The açai fruit is extremely rich in phenolic compounds



**One glass of açai drink (250 ml)**

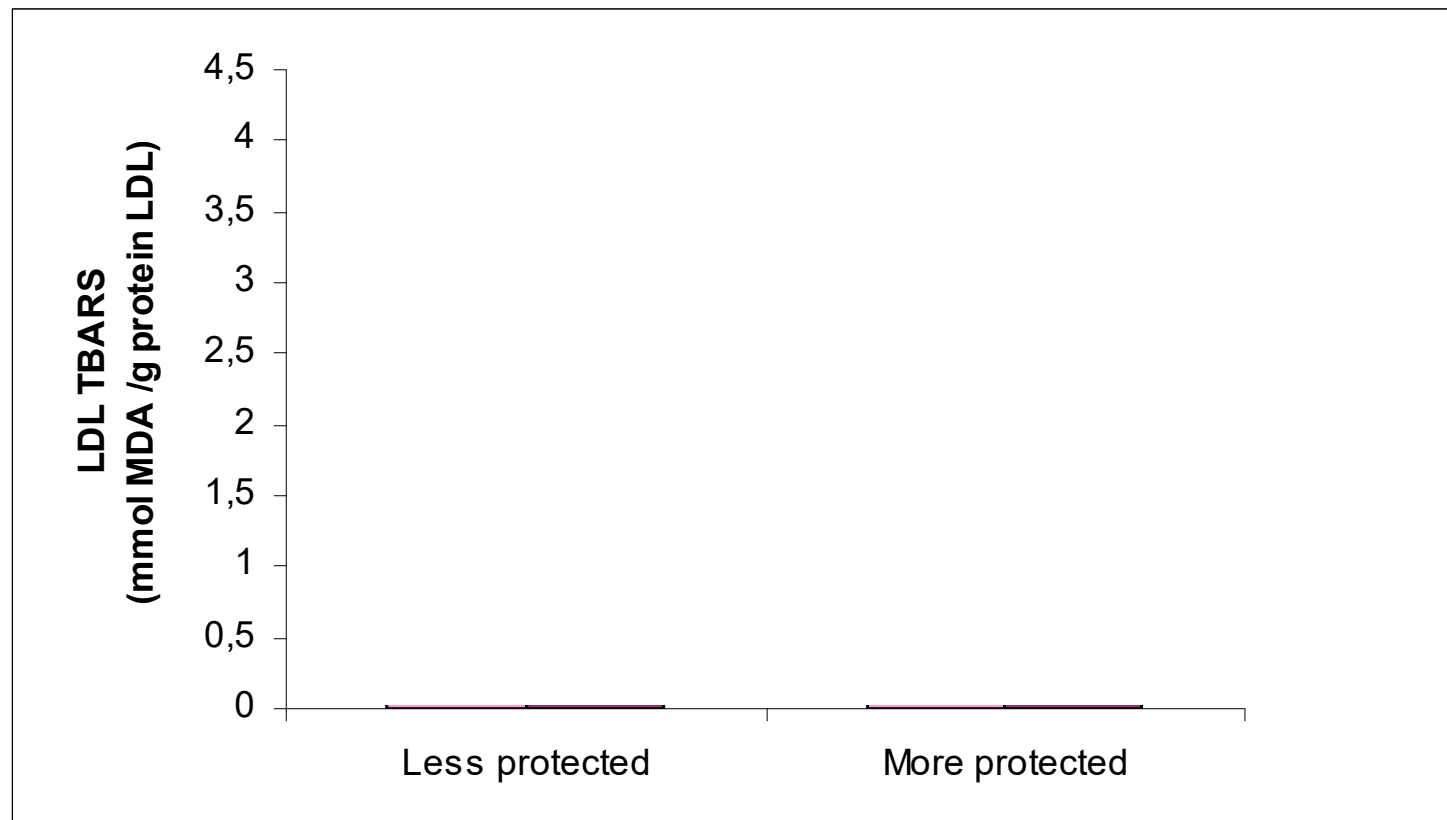


**1 g of phenolic compounds**



## The açai fruit is extremely rich in phenolic compounds

**Intervention study performed with 35 Brazilian volunteers : Impact of the intake of 350 ml açai/day during 28 days on the LDL oxidation level :**





## The accumulated knowledge on açai has been transferred to the local communities in Brazil

- Improvement of the microbiological quality
- Optimization of the harvest period



# The accumulated knowledge on açaí has been transferred to the local communities in Brazil

- Optimization of the production processes
- Pasteurization before marketing



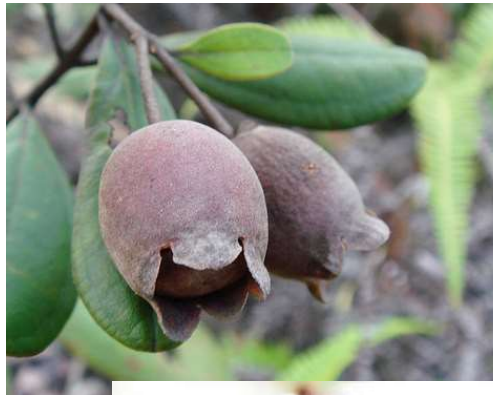
**Açaí extracts may become a very popular healthy drink  
in the near future**



# Another fruit that recently became of particular interest to us : the sim fruit from South-East Asia



## Sim (Downy myrtle or Rose myrtle) *Rhodomyrtus tomentosa* (Ait.) Hassk



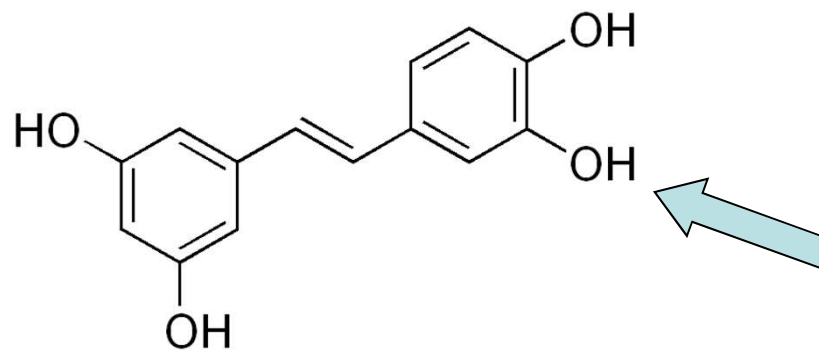
**Used in folk medicine**

- to treat diarrhoea
- to boost the immune system

# The sim fruit is one of the greatest sources of piceatannol in the plant kingdom

● **Piceatannol is more active than resveratrol in terms of bioactive properties :**

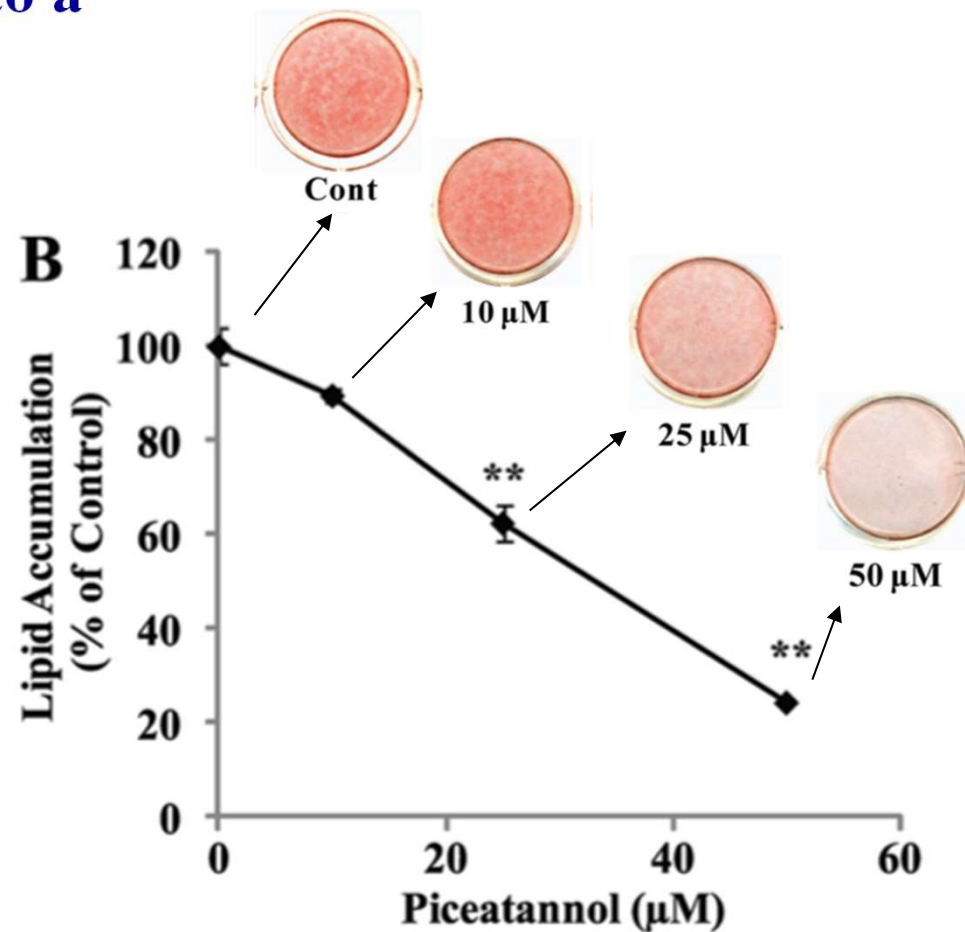
- **antioxidant**
- **anti-inflammatory**
- **anti-proliferative**
- **anti-lipogenic**





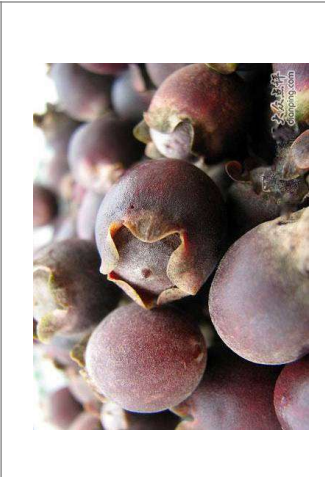
## Among others, piceatannol appears to interfere with lipid accumulation in the adipose tissue

- 3T3-L1 cells submitted to a lipogenic process in culture :

Lipid accumulation is visualized with a red colorant :





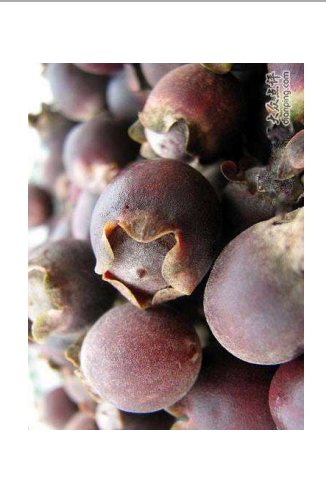


# The sim fruit is one of the highest sources of piceatannol : comparison with other sources of stilbenes

	Blueberry	Grape	Sim
			
Piceatannol μg/g DW	0.2 – 0.4	4	2300
Resveratrol μg/g DW	-	16	710

Piceatannol  
μg/g DW

Resveratrol  
μg/g DW

# The sim fruit is one of the highest sources of piceatannol : comparison with other sources of stilbenes

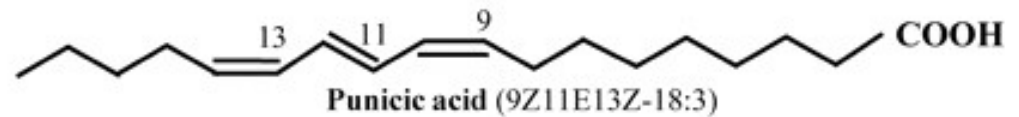
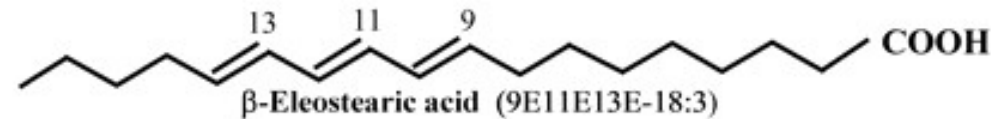
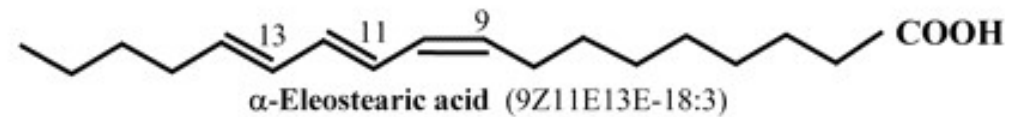
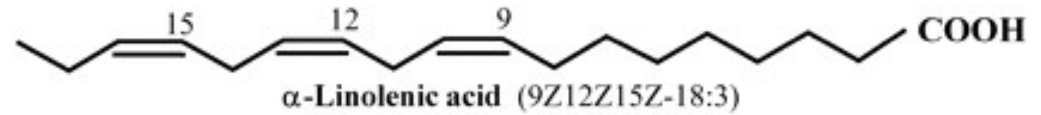
	Blueberry	Grape	Sim	Sim seeds	Passion fruit seeds
					
Piceatannol μg/g DW	0.2 – 0.4	4	2300	4890	4800
Resveratrol μg/g DW	-	16	710	870	220

Piceatannol  
μg/g DW

Resveratrol  
μg/g DW

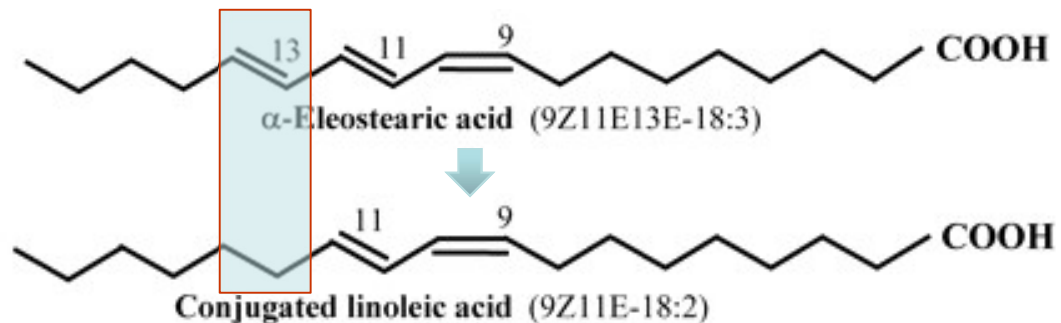


# A few oils are rich sources of conjugated linolenic acids (CLnA)



● We showed that these CLnA can be efficiently converted into CLA in the gastro-intestinal barrier:

● CLA present a whole range of health-promoting properties



## CLA were first shown to have strong anti-mutagenic effects in mice



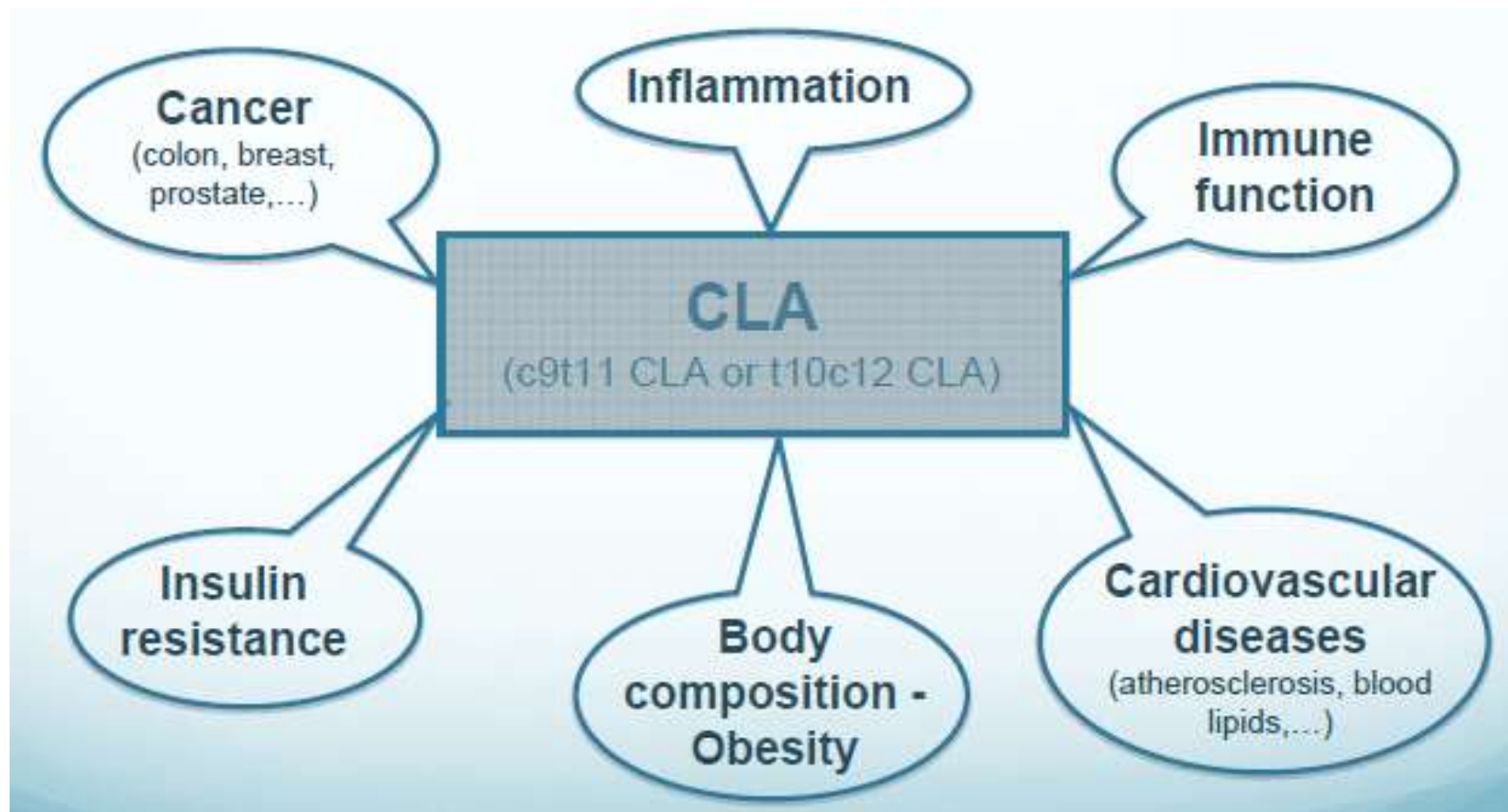
Ground beef extract



Control

M.W. Pariza and W.A. Hargraves (1985) A beef-derived mutagenesis modulator inhibits initiation of mouse epidermal tumors by 7,12-dimethylbenz[a]anthracene, *Carcinogenesis*

# CLA have now been shown to possess numerous positive health-related properties (cellular and animal models)



# Dairy products are the leading source of CLA in food



**C18:2 c9,t11 = predominant CLA isomer in bovine milk fat (75-90% of total CLA)**

**But CLA represent only a very small percentage of total fatty acids in milk fat**



# We are currently working on two CLnA-rich dietary sources with different animal and human models ...

*Ricinodendron heudelottii*



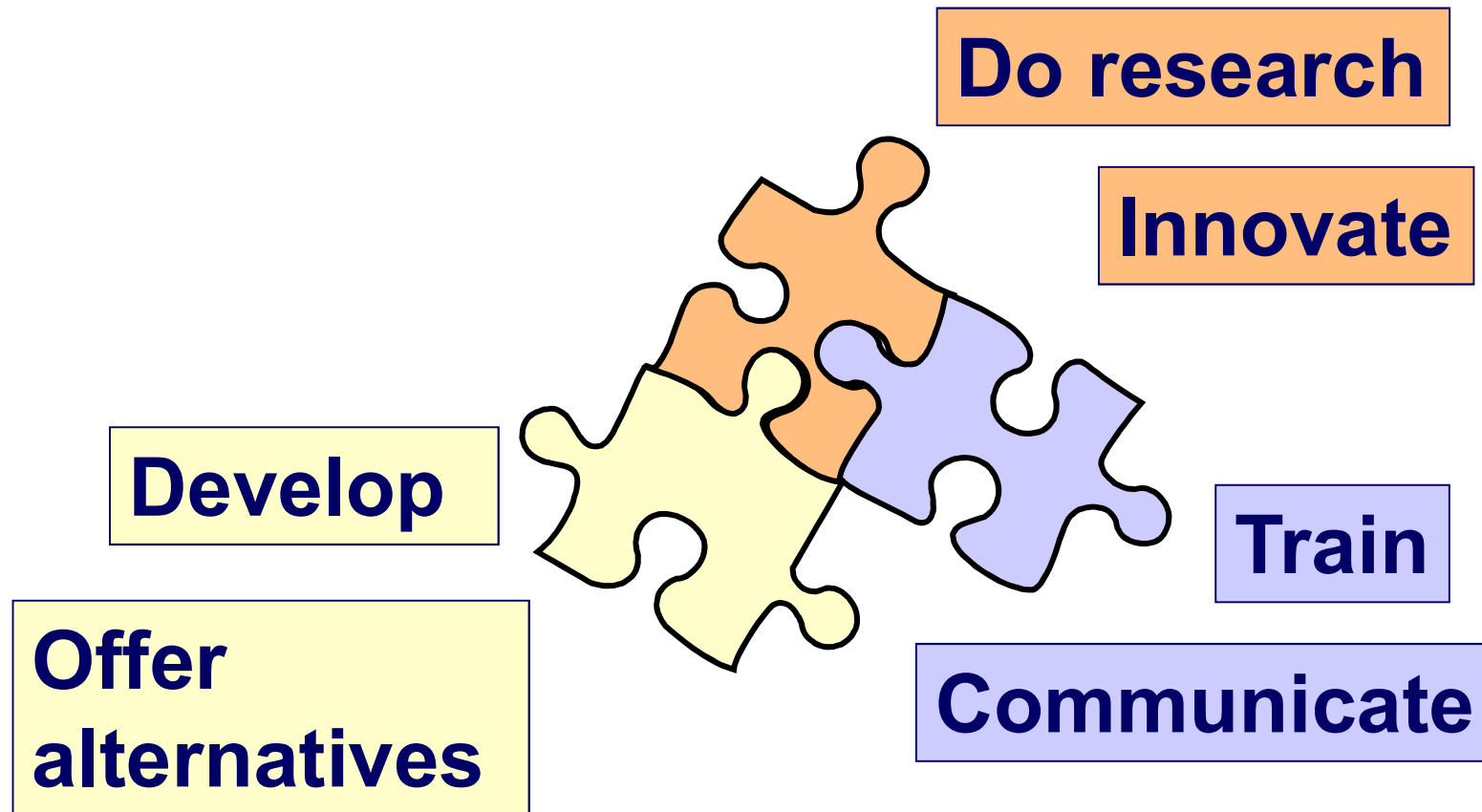
**$\alpha$ -Eleostearic acid  
(41-52 % of total FA)**

*Punica granatum*



**Punicic acid  
(60-85 % of total FA)**

**The scientists and the industry need to combine their expertise to develop health-promoting foods**



**Les résultats présentés ont été obtenus  
par un ensemble de collaborateurs belges et internationaux**



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