



# Use of microencapsulation of aromatic plants and spices as strategy for salt reduction for food and cooking

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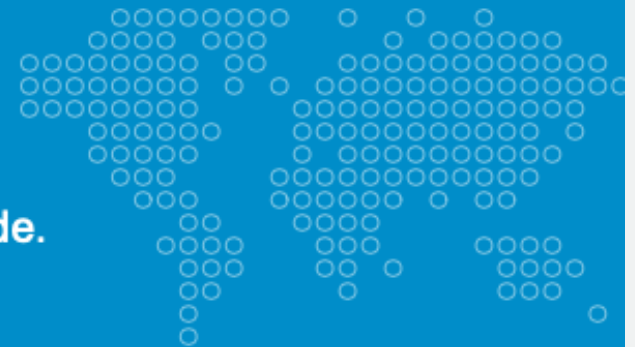
# the problem

- Cardiovascular Diseases are the **leading** cause of death in Portugal and around the world
- **Arterial hypertension** in one of the **major risk factors**

**17.9 million**

people die each year from CVDs, an estimated 31% of all deaths worldwide.

[Fact sheet](#)



# the problem

- Worldwide, **1 in 3** adults suffer from hypertension
- Arterial hypertension affects **36%** of Portuguese Population



# the problem

- Portuguese consume **2 times** more salt than recommended
- More than **70%** of salt comes from **processed foods** and **catering/restaurants**

# goal

- create a solution to reduce salt intake through food
  - processed food (industry)
  - catering and restaurants

# methodology

## PHASE 1

Research of culinary preparations  
Organising by type  
Selection of preparations to test  
Research and selection of aromatic plants  
Chemical analysis

## PHASE 2

Mixture preparation of aromatic plants  
Application in culinary preparations  
Salt quantification  
Sensorial evaluation  
Mixture reformulation

## PHASE 3

Mixture extraction  
Microcapsulate selection  
Microencapsulation (2 techniques)  
Physical-chemical characterization  
Application in culinary preparations  
Sensorial evaluation



## PHASE 4

# methodology

**Aromatic plants**

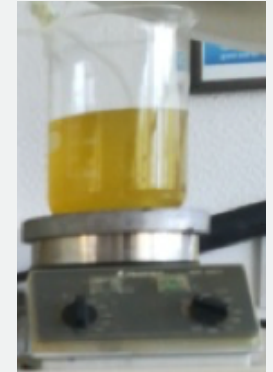


**Plant material**



**Extraction**

**Microencapsulation**



**Freeze-drying**



**Sensorial evaluation**



**Use in cooking preparation**



**Product**

# phase 4

- production of selected microencapsulate
- use in food preparation for general public
  - adult population **50% salt reduction**
  - child population **total salt elimination**
- production of the same meal two different times) and sensorial evaluation





# results

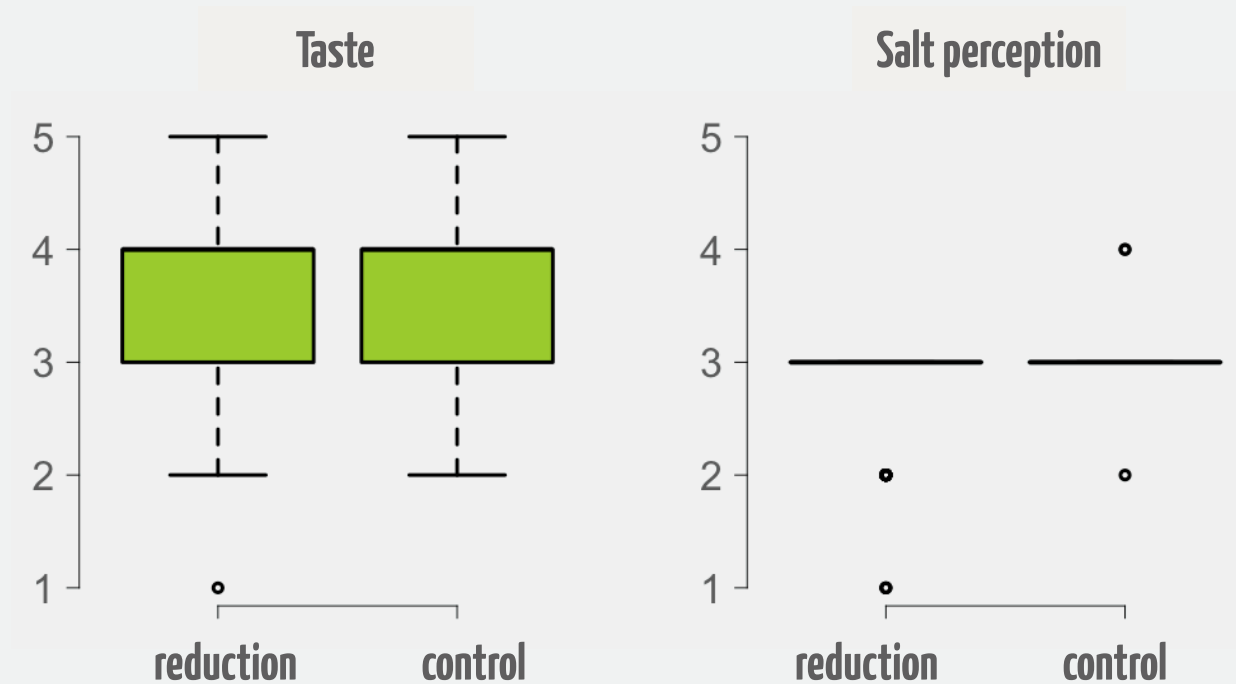
Child population - 100% salt elimination



90,5% of consumer state salt perception as **adequate**

# results (cont.)

Adult population - 50% salt reduction



78% of consumers state salt perception as **adequate**

# conclusions

- spherical form, as common salt, allows for similarity and
- high solubility allows immediate and total dissolution
- flavour and aroma concentration allows for consumer salt perception
- allows gradual salt reduction or total elimination
- concrete strategy for salt reduction both for catering, restaurants and at home

# further work

- already have a company interested in producing and commercialise the product
- scale up process

# team work



**Cláudia Viegas**  
Nutricionist



**Carmo Serrano**  
Technological chemistry



**Margarida Sapata**  
Food Engineer



**André Gerardo**  
Chef

# we need to thank



... you !