

Edible jellyfish in Europe: new opportunity for local economies



Funded by the H2020 EU project "GoJelly – A gelatinous solution to plastic pollution." n.774499

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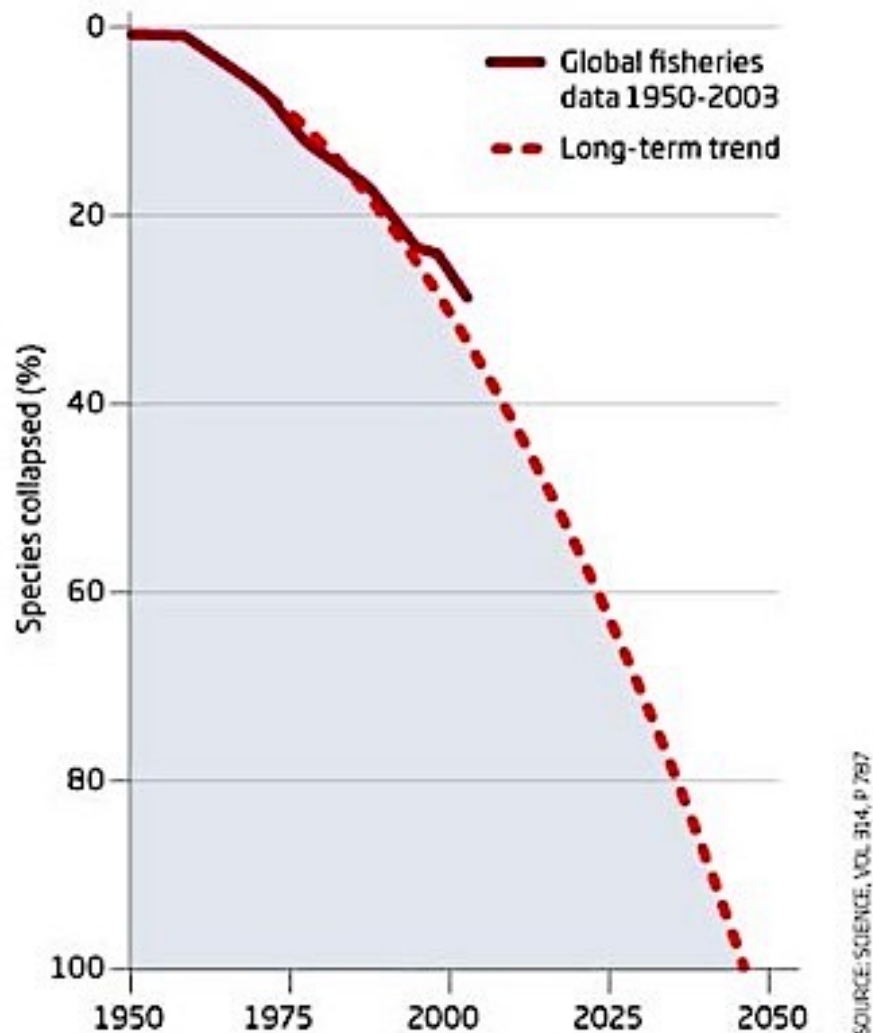
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Fishery resources: What's in our seas?



- ✓ According to FAO report, around 34.2% of fish stocks are fished at biologically unsustainable levels
- ✓ There is a trend towards a reduction in catches worldwide
- ✓ If there is no change in this trend, all our fishing activities will collapse by **2050 !**



Fishery resources: What's in our seas?

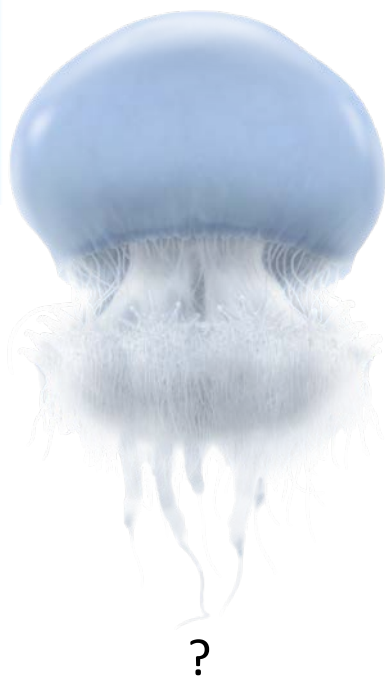


- ✓ Jellyfish bloom phenomena seems to increase in some coastal areas
- ✓ Jellyfish biomass as a resource for valuable **bioactive compounds** extraction, **food**, and **food ingredients**

Port of Trieste, **Trieste**, Italy **April 2021**



Edible jellyfish



- ✓ More than 1400 species of jellyfish
- ✓ Less than **40 species** are edible
- ✓ 90% of the edible species belong to the order of Rhizostomeae

- **Big size**
- **Firm consistency**
- **Organoleptic properties**
- **Slightly or no stinging**

1997

EC Reg 258/97

2015

EU Reg 2283/2015

in force from 1 January 2018

TRADITIONAL FOODS



NOVEL FOODS

Novel Foods (NF) in Europe
NF in EU but Traditional Foods in Third Countries





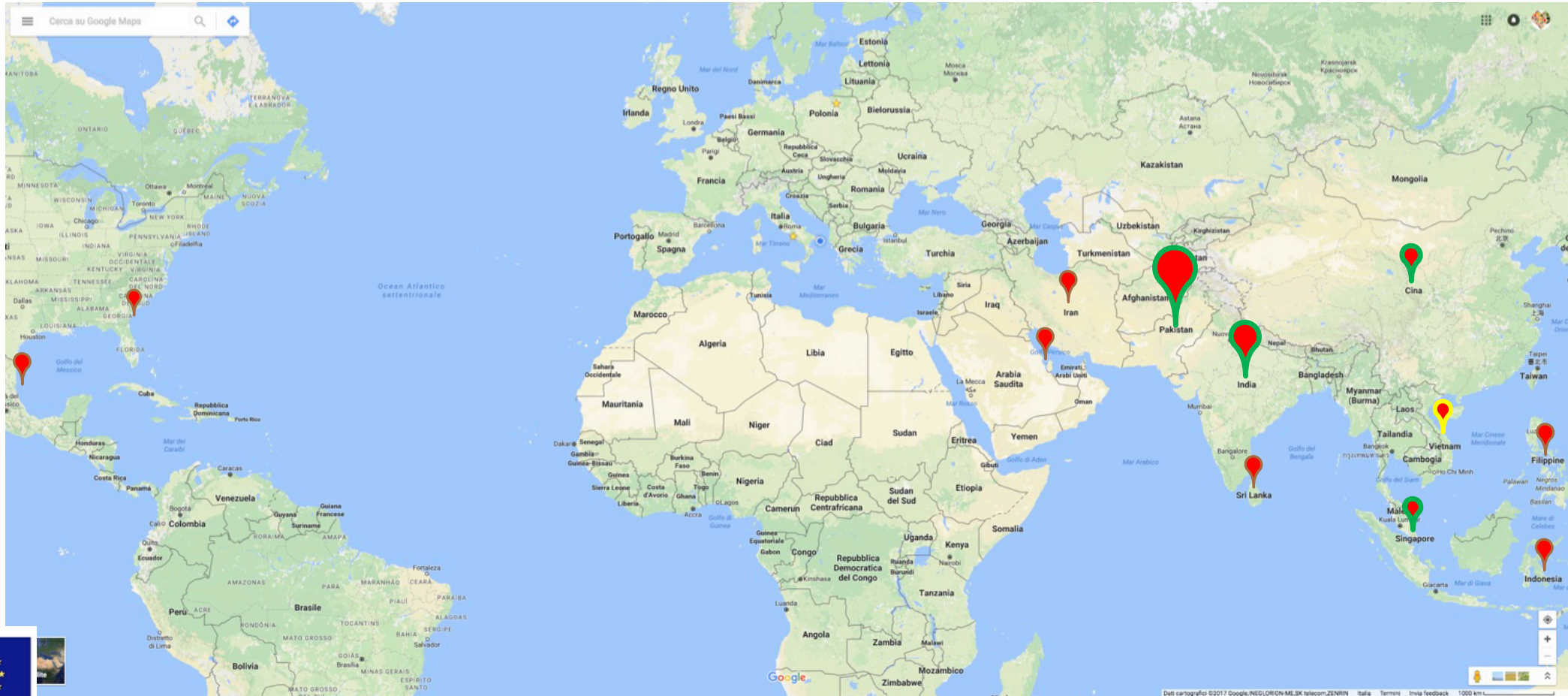
Jellyfish is traditional food in South Est Asia



Fresh, chilled, frozen, dried, salted, or in brine

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Business: 20 – 100 million USD



Products available online and in some ethnic shops in Europe ...!?





Safety of aluminum from dietary intake in Europe



- ✓ Adverse effects on developing nervous system
- ✓ Adverse effects on testes
- ✓ Neurotoxic
- ✓ Embryotoxic

Tolerable Weekly Intake (TWI)
TWI = 1 mg aluminium/kg body weight /week

Safety of aluminium from dietary intake¹



Jellyfish as a food in Europe?



Develop a “Western style” jellyfish processing for food uses

NEW SUPPLY CHAIN in EU for FOOD, FOOD INGREDIENTS and NUTRACEUTICALS

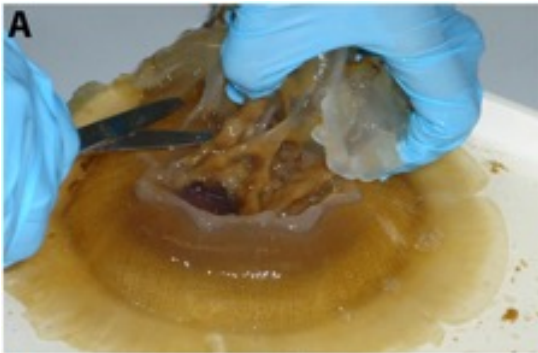
Fishing - Handling – Pre-processing – (Storage) – Processing – (Storage) – Preparation/formulation - Consumption



Develop a “Western style” jellyfish processing for food uses

Protocols for fishing, handling and pre-processing of jellyfish biomass for food production

Cotylorhiza tuberculata



Rhizostoma pulmo



Rhopilema nomadica



Phyllorhiza punctata



Quality parameters

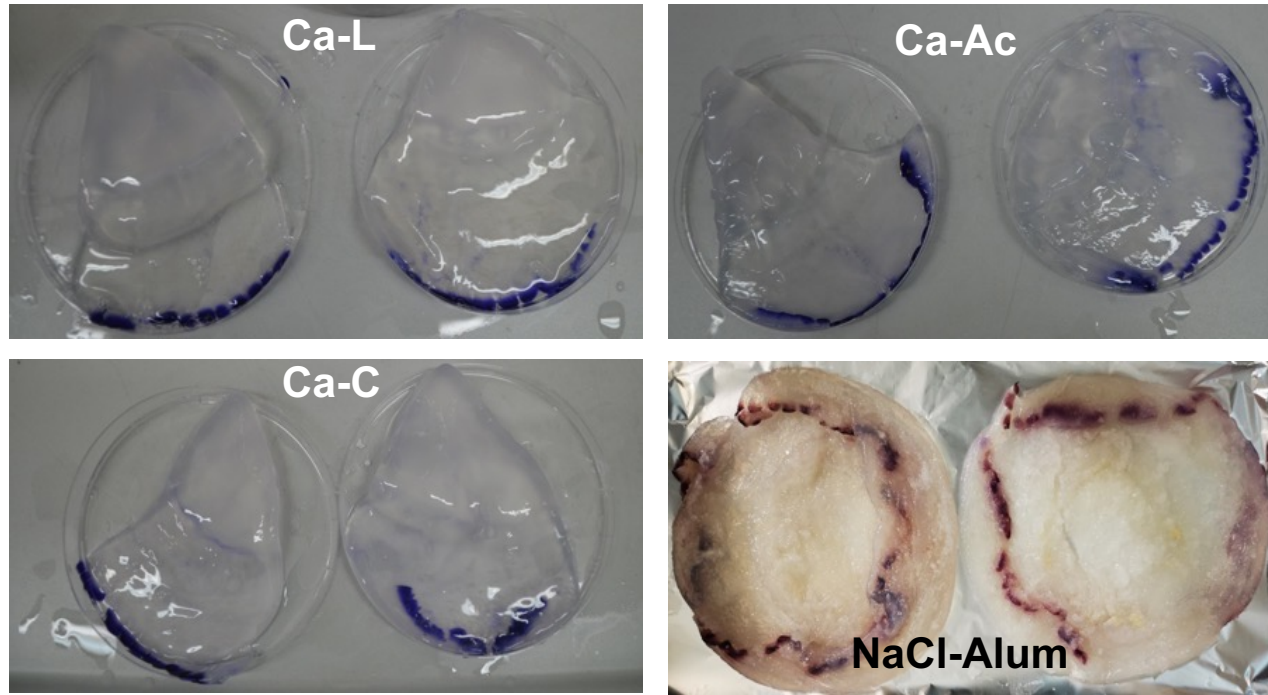
- ✓ Physical chemical characteristics and composition analysis
- ✓ Biomass characterization of different jellyfish species
- ✓ Bioactive compounds with nutraceutical activity (human cell culture assays)

Safety parameters

- ✓ Microbiological analyses (pathogenic and/or probiotics)
- ✓ Heavy Metals, microplastics, etc
- ✓ Toxicity of venomous substances typical of the jellyfish
- ✓ Jellyfish associated allergens

Bleve et al. Foods 2019, 8, 263;
Bleve et al., Front. Nutr., 2021, 23.
Papers *in preparation*

A new procedure for **processing** jellyfish **without the use of alum** was developed and patented by CNR-ISPA, Italy



Alum-free process

Alum-free innovative products

Granted the Italian patent -

Appl. n. IT201900011472A1

European Patent Appl. n. EP20185250A

as an extension of the IT patent

Leone A, Blevé G, Gallo A, Ramires FA, De Domenico S, Perbellini E. Method for the treatment of jellyfish intended for human consumption without the use of aluminium salts and products/ingredients obtained by this process. European Patent EP 3 763 224 A1 (2021)

Papers in preparation



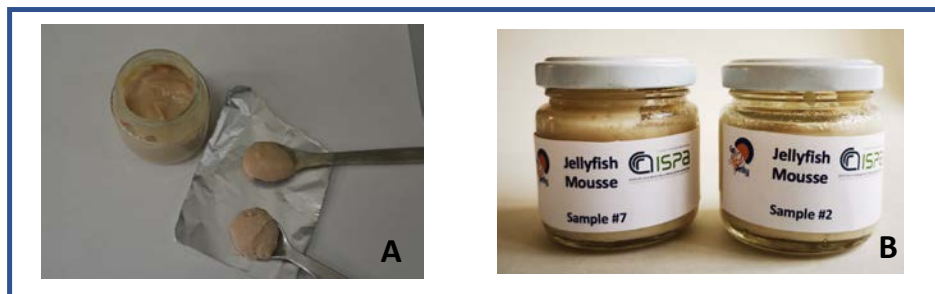


Jellyfish-based **alum-free** products were developed

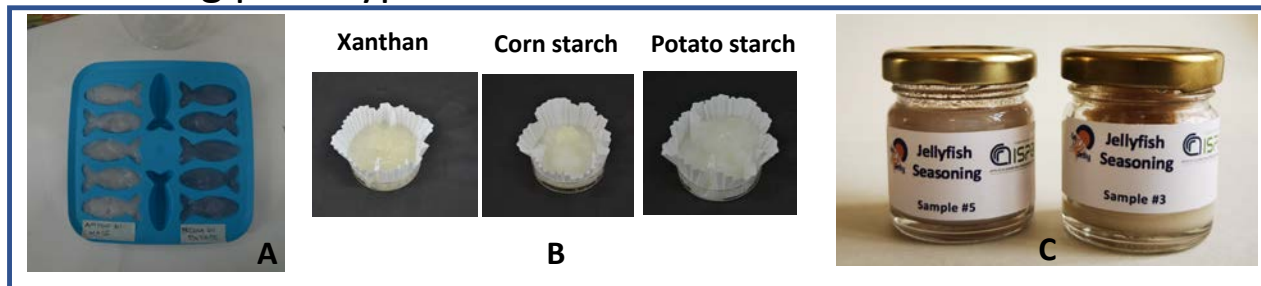
Semi-finished product



Mousse prototype



Seasoning prototype



Semi-finished products and formulation for new jellyfish based foods:

- JF-based mousse
- JF-based meringues
- JF-based thickening/seasoning

Meringues prototype

Papers in preparation

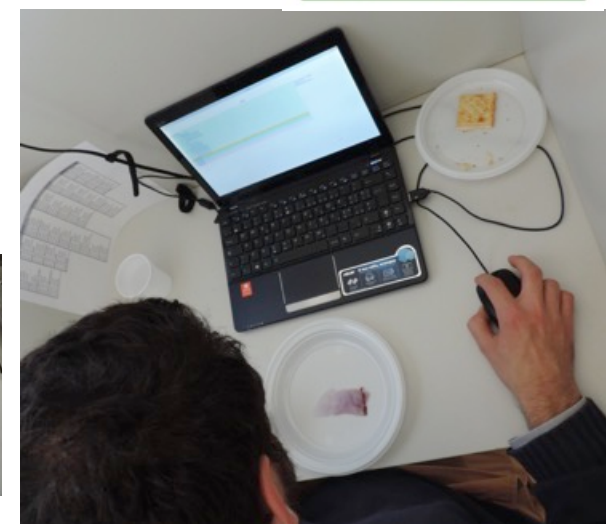




Sensory analysis of jellyfish based novel food

- ✓ **Selection, training and validation** of the members of the **panel** for jellyfish sensory analysis
- ✓ Set up of **sensory analysis** of a real novel food with the first samples
- ✓ **Sensory analysis** of the jellyfish based foods including prototypes
- ✓ *Useful in Consumer Science:* Indication about the **acceptability** of jellyfish preparations

Paper in preparation





Scaling up and **prototype demonstration** in operational environment



- Transfer of know-how and methodology to SMEs (Italian SME Partner of GoJelly)
- Scaling up and validation of the process



Develop a “Western style” jellyfish processing for food uses

From the lab to the chef !

CNR EXPO



European Jellyfish
COOKBOOK

New perspectives on marine food resources



https://www.cnr.it/sites/default/files/public/media/attivita/edizionale/9788880803959_JELLYFISH%20COOKBOOK%20EN.pdf

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Gianluca Bleve



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Francesca A. Ramires



Antonia Gallo



Nino (Leone) D'Amico



Thanks !