



XIII Congreso de Economía Agroalimentaria

Cartagena 1-3 Sep. 2021

Sesión-6.2: Comunicaciones

Innovación en alimentación, consumo y marketing



Impact of COVID-19 Pandemic on Willingness to Consume Insect-based Food Products in Catalonia

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Environmental Concern due to Livestock Production

- **Increasing global demand for meat** due to global population increase and rising incomes in developing countries
- Resulting in depletion of water and land resources, water pollution, deforestation and habitat destruction, climate change.
- Solutions: manure management, using more sustainable animal feed, reducing food waste, reducing demand for meat by **introducing alternative more sustainable sources of protein**



Insects as a Sustainable Source of Protein

- Food and drinks enriched with insects accessed the European market starting 2014 (Mintel, 2021)
 - Whole insects
 - Products with insect powder: bread, burger patties, energy bars, chocolate, etc.
- **Novel** food in Europe
- First edible insect **authorized for human consumption** by European Commission:
1 June 2021 for yellow mealworm (EU) 2021/882



Benefits of Insect Rearing

-**Environmental** and **nutritional** benefits

-Suffers from **low consumer acceptance:**

- neophobia
- disgust
- cultural inappropriateness
- association with primitive behavior
- lack of awareness
- vectors of disease

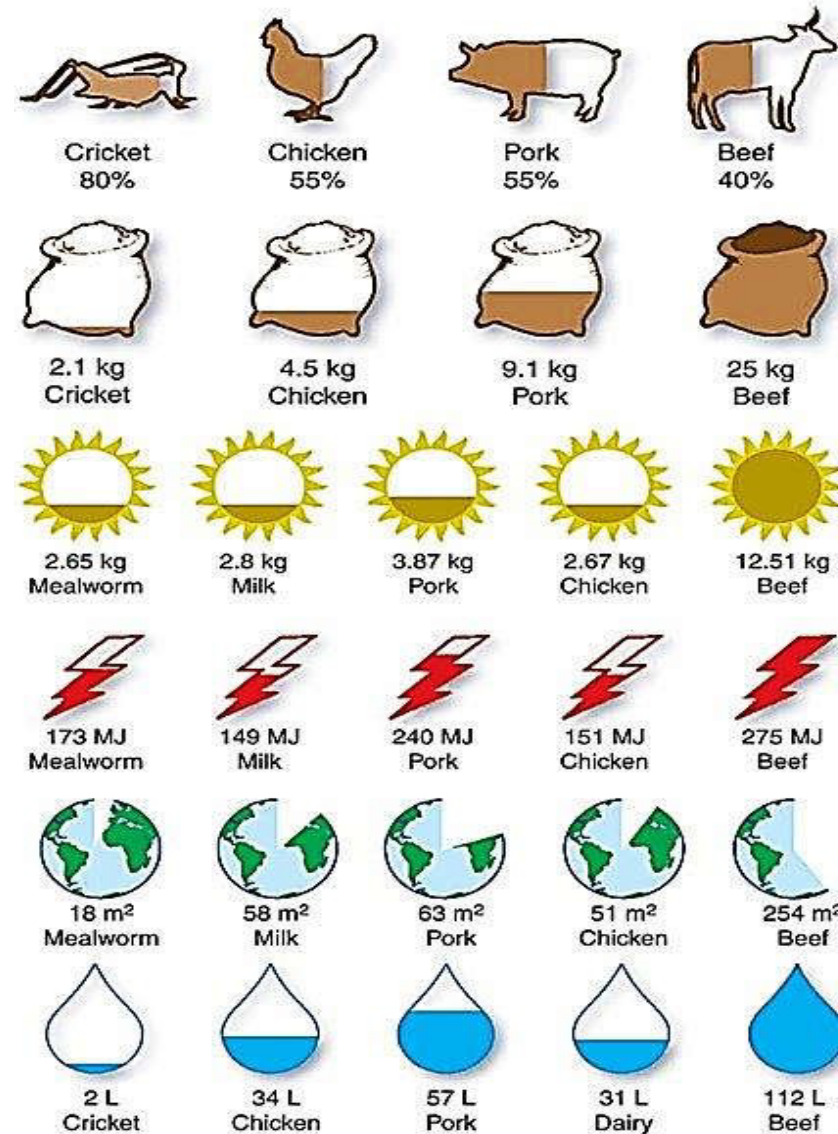


Fig.1: Resource Use and Production of Greenhouse Gas Equivalents for Insect and Livestock Farming (Dossey et al., 2016)

Objectives

- Analyze **willingness to consume (WTC)** of **two new products** with insect ingredients: jam and yogurt
- Determine **impact of COVID-19** on WTC
- Analyze determinant **factors** of WTC: socio-demographics, food consumption/purchasing behavior



Cricket Powder



Mealworm Powder



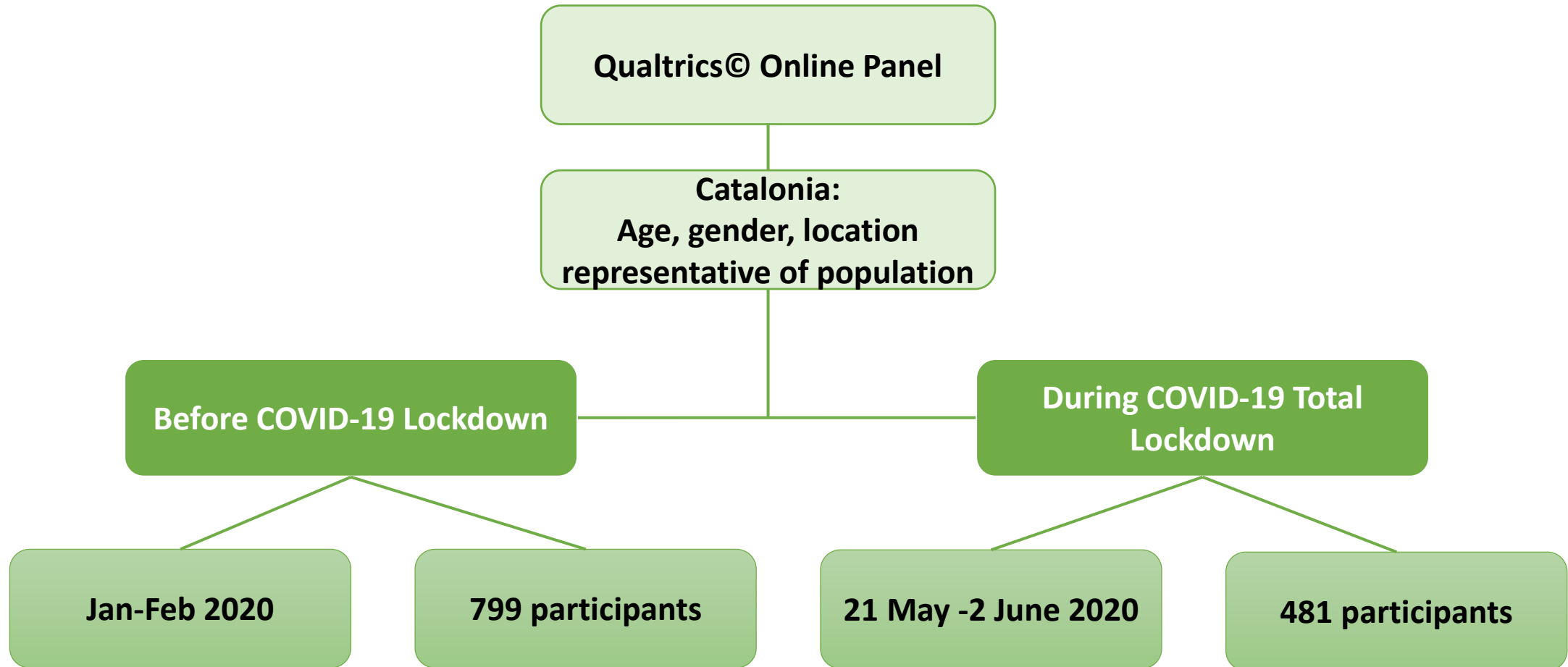
Strawberry Jam



Natural Yogurt

Data and Methods

Data Collection



Semi-structured
(3 parts)

Socio-demographics:

age, gender, education level, income, employment situation, and family size

WTC question of strawberry jam and natural yogurt enriched with insect protein

Would you be willing to consume enriched food products with insect protein if their organoleptic characteristics remain unaltered (taste, color, and odor)?

5 scale: Yes, probably yes, don't know, probably no, no

Consumers' food consumption/purchasing behavior opinions and attitudes

food purchase place

consumers' relative importance of: price, origin, quality, convenience, nutritional value, and ecological value when buying food

consumers' opinions and attitudes towards sustainable behavior

Data and Methods

Multinomial Logit (MNL) Model

- Regression model: dependent variable consists of more than two categories
 - *positive WTC* (yes)
 - *uncertain WTC* (probably yes, don't know, probably no)
 - *negative WTC* (no)

$$\ln \frac{P(Y = i)}{P(Y = 1)} = \alpha_i + \sum_{h=1}^H \beta_{ih} X_{ih}$$

i : Number of WTC/WTP' categories

α_i : Constant

$\beta_{ih} X_{ih}$: Vectors of the estimates parameters and predictor variables respectively

$\frac{P(Y = i)}{P(Y = 1)}$: Probability of each category with the first category as reference

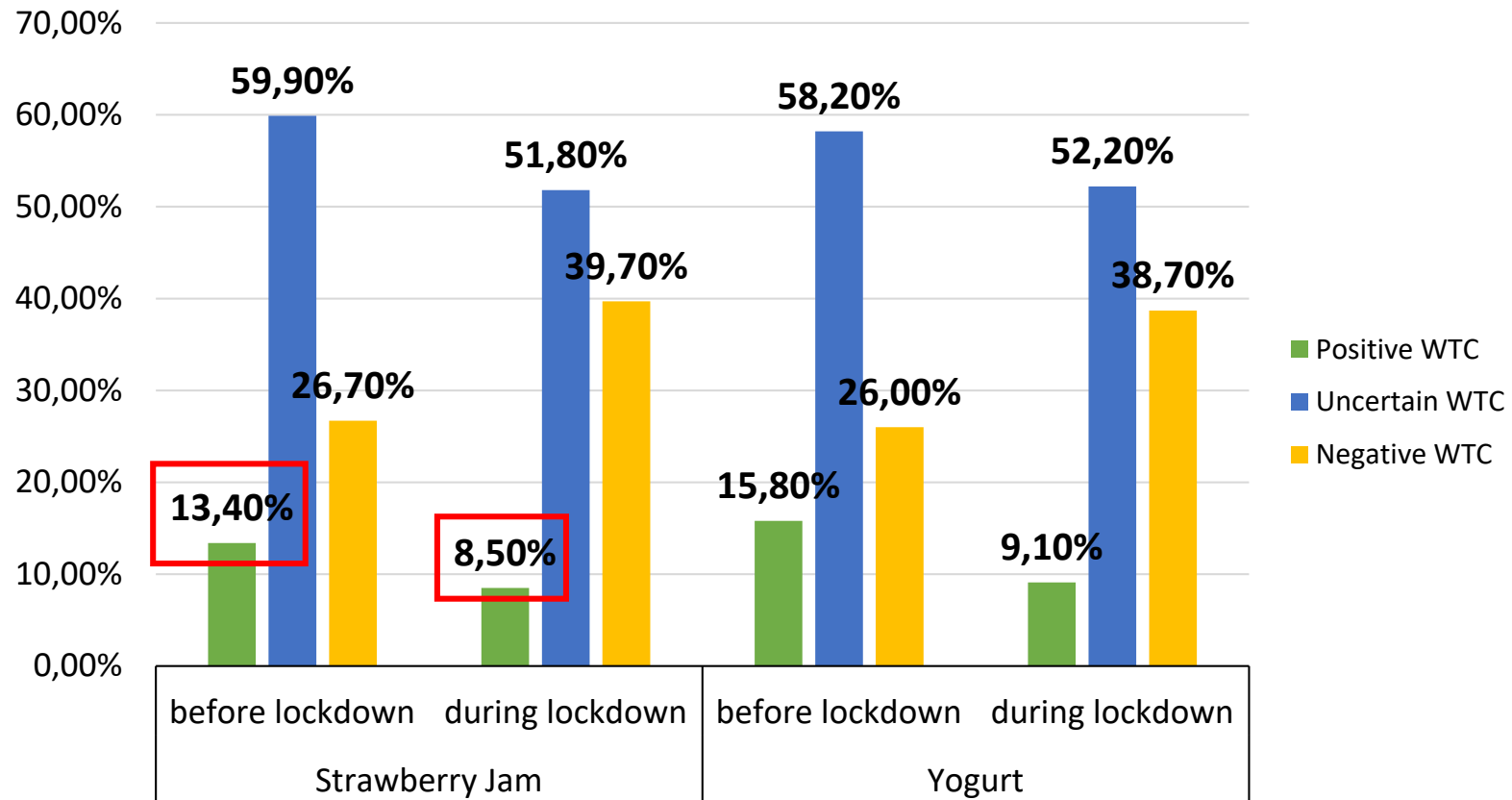
h : takes values between 1 and H

H : number of independent variables in the model

Results and Discussion

WTC before and during lockdown

Chart 1: Willingness to consume insect-based strawberry jam and yogurt before and during lockdown



Results and Discussion

Common Determinant Factors



Before lockdown

During lockdown



Variable	Positive WTC		Uncertain WTC	
	β	e^{β}	β	e^{β}
Gender: Male	1.17***	3.23		0.37* 1.45
Age: 18-39 years old	1.27***	3.55	1.59***	4.88
Ecological Attribute	2.20***	9.02	0.85**	2.35
Income: 1000€ or less	0.83**	2.28	1.40**	4.06

Determinant factors before lockdown only

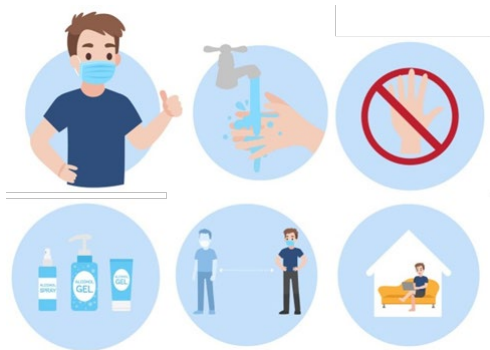


Variable	Positive WTC	
	β	e^{β}
Quality score of seasonal food	-0.16*	0.85
Education: university level	0.54**	1.71



- Considered of low quality: disgusting, not safe for consumption, visually unappealing, socially rejected as food, negative expectations towards taste.
- Higher environmental awareness and higher interest in alternative sustainable proteins.

Determinant factors during lockdown only



Variable	Uncertain WTC	
	β	e^{β}
Following restrictions	-0.19*	0.82
Increase in food prices	-0.56***	0.57



- Lack of risk assessment and scientific information caused a level of uncertainty and fear which eventually lead to decreased consumption.
- In times of a financial crisis and with increased market prices, unemployment, and reduced incomes; people will limit their budget to essentials and exclude novel foods from their shopping list.

Conclusion

- **WTC** insect-based products in Catalonia **decreased significantly during the COVID-19** lockdown for both genders
- **Western culture** continues to associate insect-based foods as **low-quality** products feeding **low-income countries**
- Consumers need to be ensured that **insect consumption is safe**
- Outbreaks of infectious diseases have **temporary consequences on consumer behavior**
Longer-term research needed to justify change in trends
- Edible insects could be a **potential solution to safer sources of proteins** compared to conventional livestock when it comes to zoonotic diseases



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THANK YOU