Foods 2025 Conference
The 6th International Electronic Conference on Foods
28–30 October 2025 | Online
MDPI

Enhancing Pork Burgers with Cricket (*Acheta domesticus*) Flour: A Feasibility Study On Quality Attributes

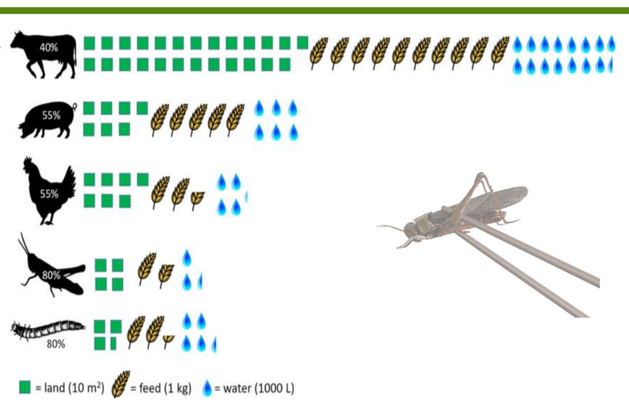
J. Rodríguez-Párraga[1], C. Botella-Martínez[1], R. Lucas-González[1], M. Viuda-Martos[1], J. Fernández-López[1], JA. Pérez-Álvarez[1]

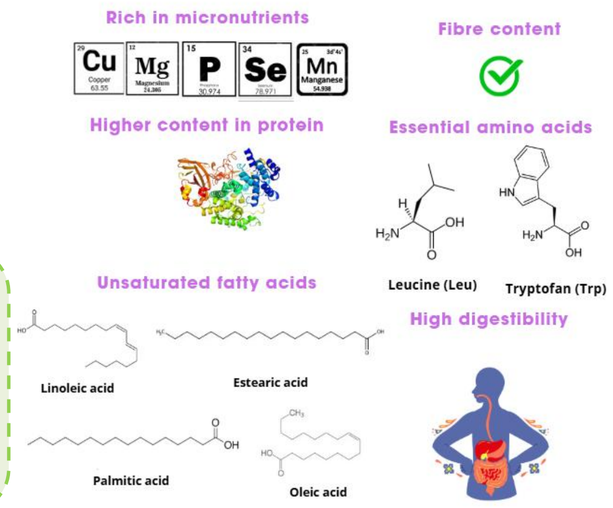
[1]IPOA Research Group, Institute on Agri-Food and Agri-Environmental Research and Innovation (CIAGRO-UMH); Miguel Hernández University, Crta. Beniel km 3.2 03312, Orihuela, Spain.

INTRODUCTION & AIM

There is a growing demand for alternative protein sources due to the unsustainability of traditional ones. Edible insects are a promising option thanks to their nutritional value (high protein, essential fatty acids, minerals) and sustainable production (efficient conversion, low environmental impact). Among them, the house cricket (*Acheta domesticus*) stands out as one of the most promising alternatives for the food industry.

Its application as ingredient in the food industry should be after grounding, as flour or powder.





AIM

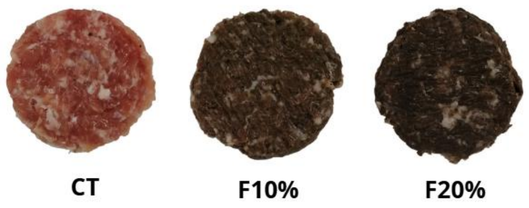
To determine the potential of house cricket powder as a functional ingredient in pork burgers, assessing its impact on the nutritional composition, technological properties and sensory acceptance of the burgers

METHOD

Three different batches of burgers were produced: Pork burgers (70% lean meat and 30% backfat, water, salt, and spices) were elaborated as Control (**CT**). Other two batches were formulated with the replacement of 10% and 20% of lean meat by *Acheta domesticus* powder and were called **F10%** and **F20%**, respectively.

ANALYSIS CARRIED OUT

Cricket flour (CF)



CT F10% F20%

Techno-functional properties

- ❑ Water Holding Capacity (WHC)
- ❑ Oil Holding Capacity (OHC)
- ❑ Swelling Capacity (SWC)
- ❑ Gelling Capacity (GC)
- ❑ Emulsion Activity (EA)
- ❑ Emulsion Stability (ES)

pH & color properties

Proximate composition

- ❑ Moisture
- ❑ Protein
- ❑ Fat
- ❑ Total dietary fiber-TDF
- ❑ Ash

Physico-chemical properties

pH, aw & color properties

Texture profile (TPA)

Cooking properties

Cooking loss & shrinkage (%)

Sensory analysis

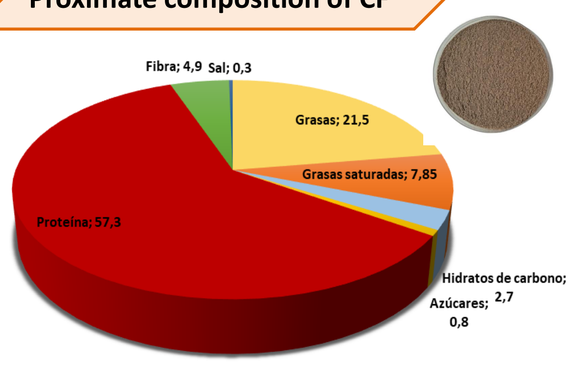
Data were analyzed using one-way ANOVA with Tukey's post-hoc test (95% confidence, SPSS v24). Results are reported as means ± standard deviations in tables and figures.

RESULTS & DISCUSSION

TECHNOFUNCTIONAL & PHYSICO-CHEMICAL PROPERTIES

	CF
WHC (g water/g sample)	2.89±0.1
OHC (g oil/g sample)	1.76±0.04
SWC (mg/g)	0.73±0.42
GC (%)	56.67±5.77
EC (%)	66.67±2.89
ES (%)	77.47±0.95

Proximate composition of CF

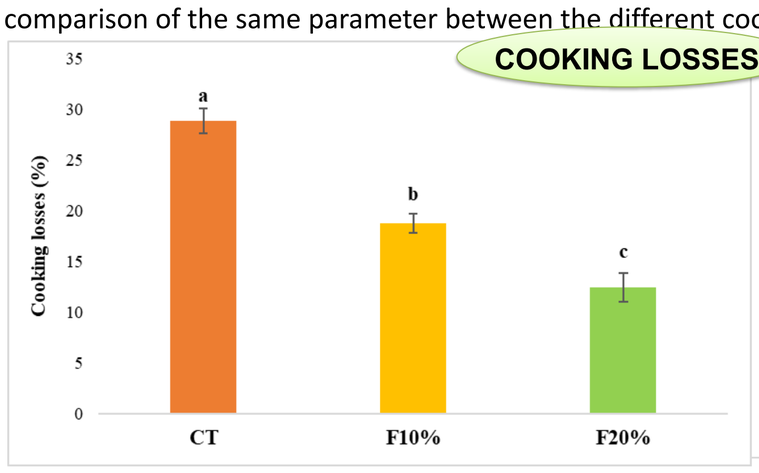


PROXIMATE COMPOSITION

Sample	Protein (g/100 g)	Fat (g/100 g)	Ash (g/100 g)	Moisture (g/100 g)	TDF (g/100 g)
CT	17.89±0.25^{b}	7.22±1.47^{a}	2.13±0.08^{c}	72.38±3.8^{a}	nd
F10%	20.79±0.85^{a}	6.30±0.97^{a}	2.44±0.09^{b}	68.56±1.14^{b}	0.56±0.02^{b}
F20%	20.50±1.07^{a}	6.91±1.58^{a}	2.74±0.03^{a}	66.97±0.13^{b}	1.11±0.03^{a}

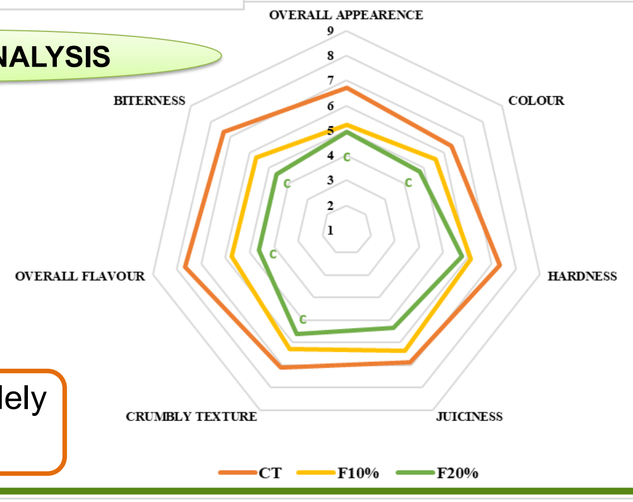
For each parameter, results followed by the same letter are not significantly different according to Tukey's post-hoc HSD test ($p > 0.05$). A lowercase letter refers to the comparison of the same parameter between the different cooked samples (a-c).

COOKING LOSSES



Reduction in cooking losses in a concentration-dependent manner

SENSORY ANALYSIS



CF in patties also induced…

Texture and **juiciness** improvement due to **WHC** and **OHC** of CF

CT & F10% were the most widely accepted by consumers

CONCLUSION

Cricket flour shows a high potential for the meat industry in order to obtain healthier hybrid meat products. Its use as meat substitute improves the nutritional quality of pork burgers (higher protein and dietary fiber content) and reduces cooking losses. However, its addition at high concentrations reduces its overall acceptance mainly due to color and flavor attributes.

FUTURE WORK

The development of hybrid meat products should be directed toward strategies to mask or mitigate these sensory alterations, either by incorporating additional ingredients such as spices or natural colorants, or by applying specific treatments to the insect flour to minimize its impact on the sensory profile.