



AFTER

CONGRÈS

11 & 12 novembre 2014

# Studies on reengineered Kitoza (a Malagasy meat product): sensory properties and consumer acceptance in the EU

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# Introduction



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## Kitoza

Kitoza is a traditional Malagasy meat product made from beef or pork strips of 20 to 50 cm long and 2 to 4 cm wide salted and then dried and/or smoked for preservation.



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# Kitoza

This product is widely consumed in Madagascar, but **do not meet EU food safety requirements.**



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**AFTER, aims to reengineering the traditional product to improve it for the benefit of consumers, producers and processors in Africa and Europe.**

**The reengineering of Kitoza seeks**

- **to overcome food safety problems**
- **to improve nutritional properties**

**to facilitate their promotion and introduction to EU markets.**

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## The main objective:

- Establish the sensory profile
- Study the acceptability by Portuguese consumers

## Of improved product

- Smoked Kitoza beef
- Smoked Kitoza pork

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# Materials and Methods



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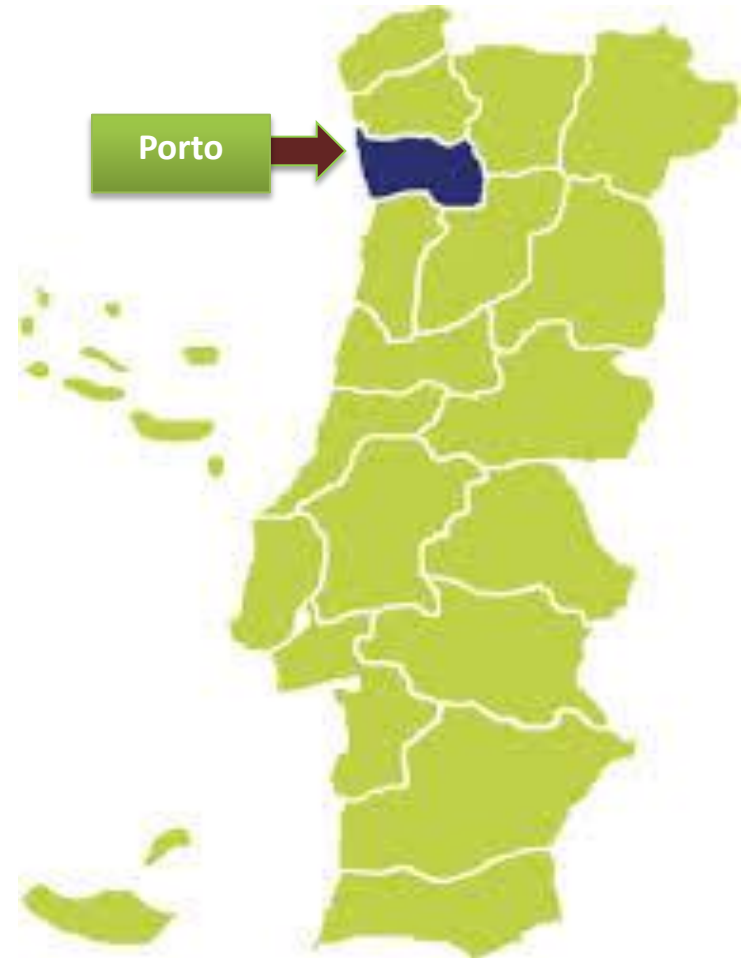


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Sensory profile of Kitoza products and consumer acceptance tests were conducted in Portugal.



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Two smoked Kitoza samples were studied:

- Kitoza beef (KB)
- Kitoza pork (KP)
- Traditional Portuguese smoked loin sausage (PS) was used for comparison.



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Kitoza samples, beef and pork, were prepared in France.

The process was controlled from the **fermentation step**, which was used in the **biopreservation strategy** and added **salt, spices and other condiments** according to the traditional process.

The step of **drying and smoking** were also optimized, as well as **packaging**, achieving a package that kept all the characteristics of the final product for the "Best before" data of 25 days at a controlled temperature.

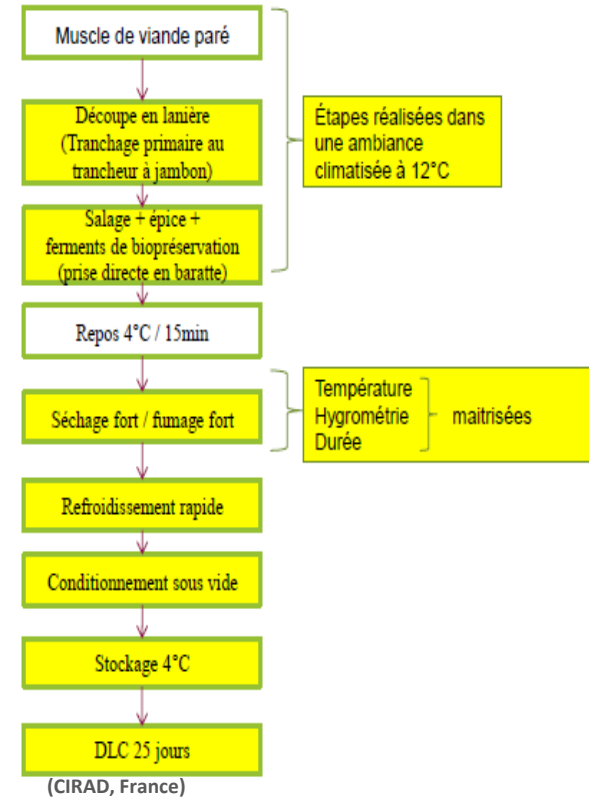


Diagramme de fabrication préconisé pour la réingénierie Europe



## Sensory Profile

For sensory profile all samples were rated by 17 sensory panelists using a **Flash Profile (FP)**, a technique that combines **individual panelist vocabulary generation** through **free choice profiling** and **attribute intensity ranking**.

The results were analysed using **Generalized Procrustes Analysis (GPA)**, a multivariate statistical technique. **XLSTAT (Addinsoft)** software was used to analyze data.



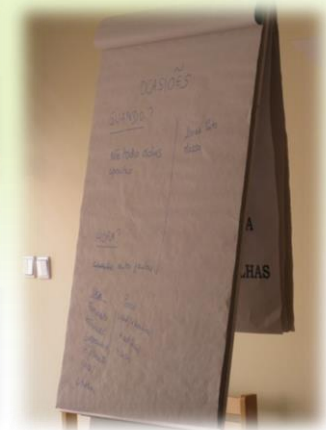
## Consumer acceptance tests

Participants were recruited (Porto, n=94) according to their willingness and availability to participate in the study.

65% of participants consumed different types of charcuterie at least weekly. Their ages ranged between 18 and 55 years old (average 29); 99% were European.

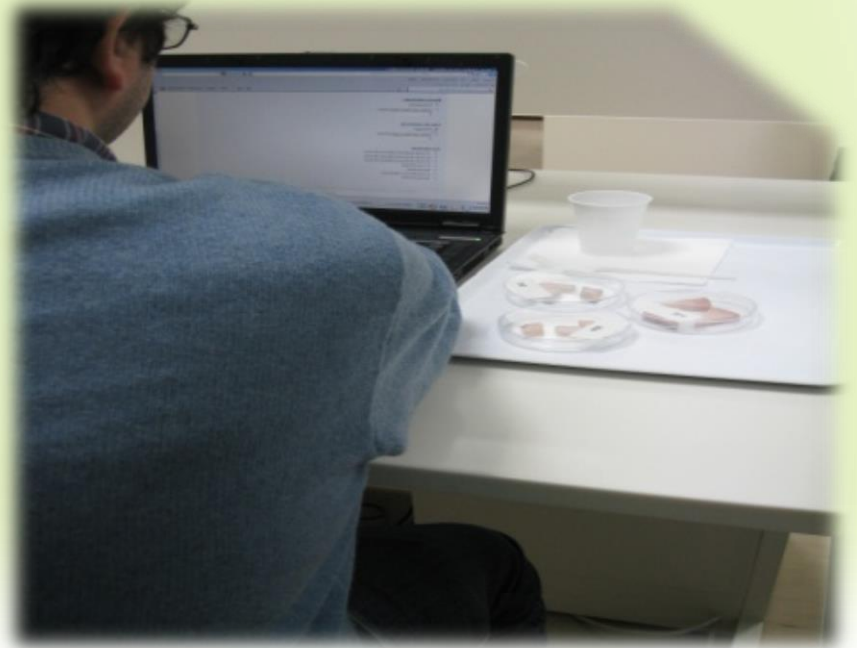


A focus group session was previously performed to gather relevant qualitative information regarding products attributes and acceptance factors in the Portuguese context.



Sample acceptability was assessed by overall liking ratings provided on a 9-point hedonic scale. Hierarchical cluster analysis (Ward's method) was used to segment consumers accordingly.

Sensory attributes – slice size, slice thickness, smoked flavor and condiment, relatively to participants' ideal level were measured by attribute ratings provided on a 3-point JAR scale.





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# Results



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## Results - Flash Profile

The results of the FP show that the three samples assessed had distinct sensory profiles.

- KB was associated to descriptors darker in the outside and to a more intense meat flavour.
- KP was associated to descriptors, sweet odour, spices and smoked odour.

The sensory profile of PS was characterized by a **more intense and lasting after taste**

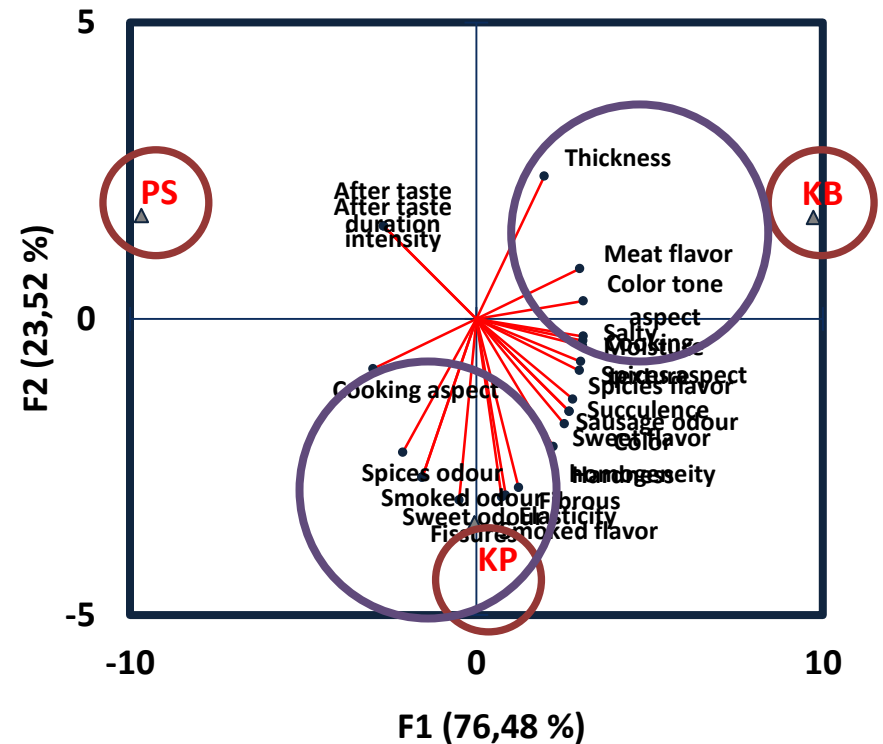


Figure 1 – Projection of Kitozo samples and Portuguese sausage and FP descriptors on the CA plot







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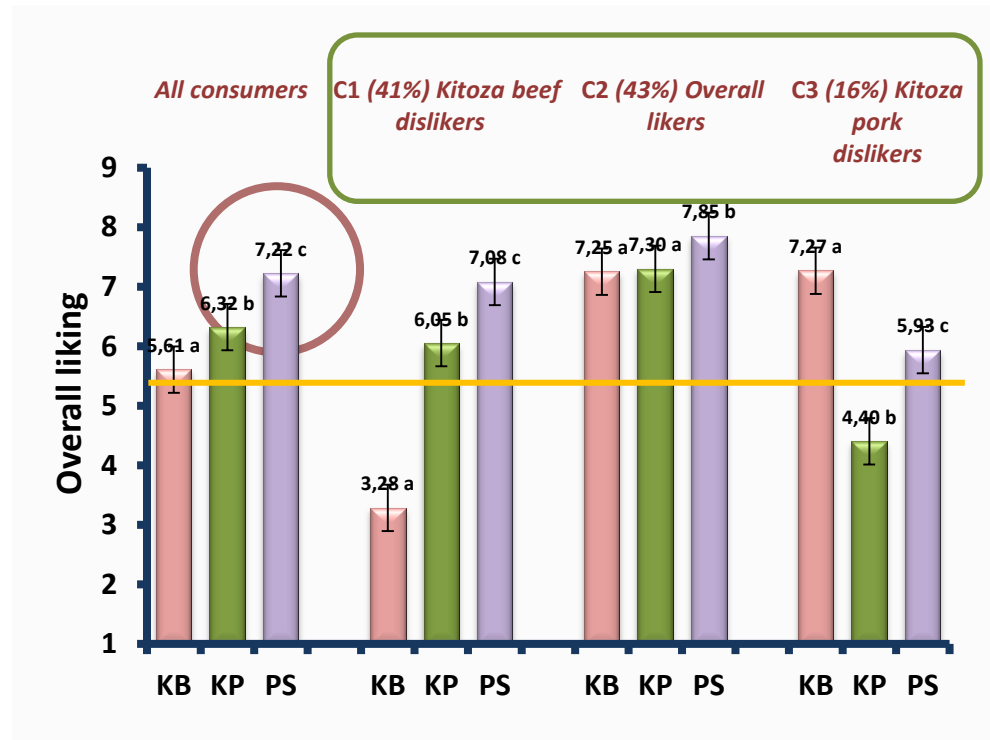
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Consumer acceptance was positive for all samples, but differed significantly ( $p \leq 0.01$ ) between them.

Mean overall liking ratings show that a PS was better appreciated than KP and KB.

Three clusters of Portuguese consumers were identified based on overall liking ratings: **C1 - Kitoza beef dislikers (41%)**, **C2 - Overall likers (43%)**, **C3 - Kitoza pork dislikers (16%)**.

### Results - Consumer Acceptance



Error bars represent the confidence interval of the mean ( $p=0.95$ ). Different superscripts within a cluster indicate significant differences according Tukey's HSD ( $p \leq 0.05$ ).

Figure 2 – Mean consumer acceptance of Kitoza samples and Portuguese sausage.



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### Results - Consumer Acceptance

**Kitoza pork** was liked by **84%** of participants (clusters C1 and C2), whereas **Kitoza beef** was liked by **59%** of participants (clusters C2 and C3).

The overall liking assessment was correlated to sensory attributes, namely:

- aspect,
- texture and
- flavor

(data not shown).

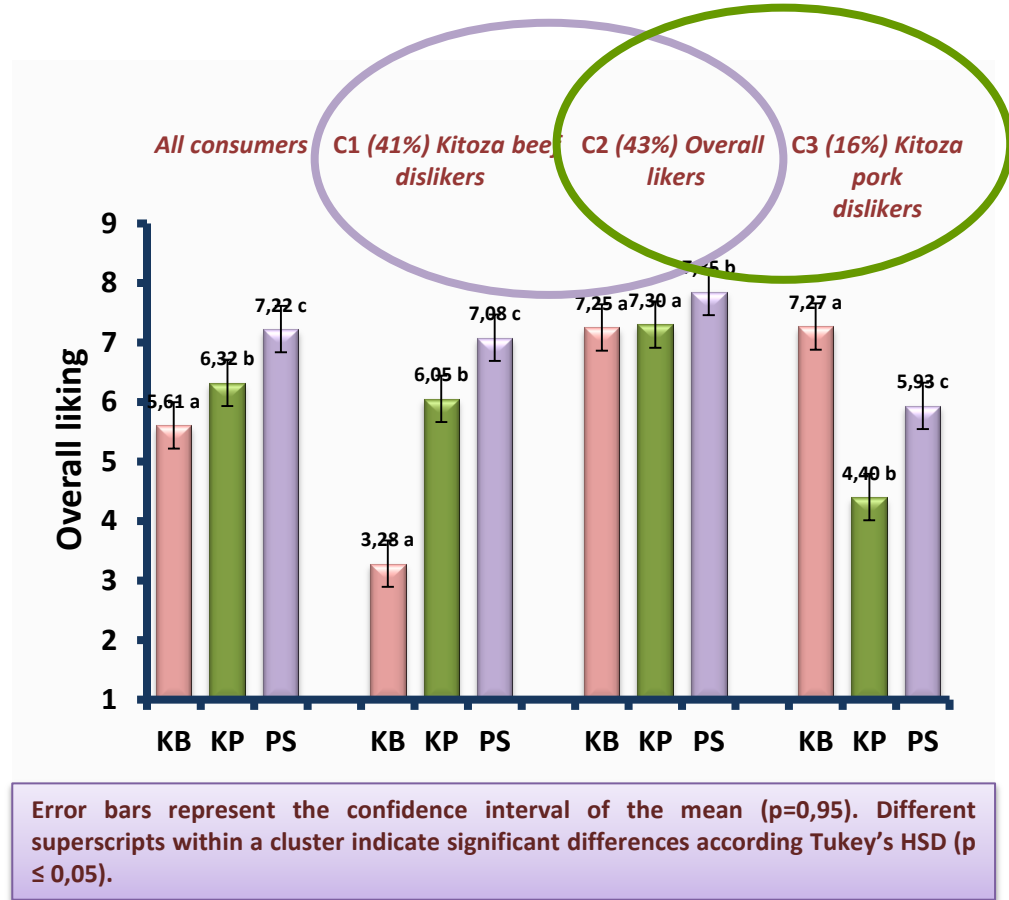


Figure 2 – Mean consumer acceptance of Kitoza samples and Portuguese sausage.

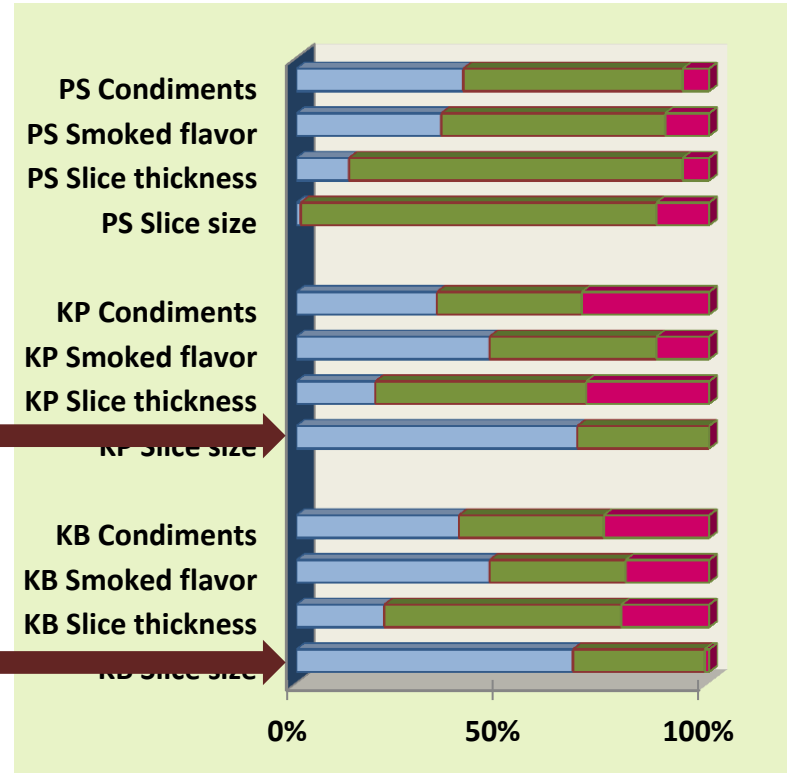
Error bars represent the confidence interval of the mean (p=0,95). Different superscripts within a cluster indicate significant differences according Tukey's HSD (p ≤ 0,05).



## Results - Consumer Acceptance

The results of the JAR highlighted that Kitoza beef and Kitoza pork should have:

- larger slices size
- stronger smoked flavour



Legend: ■ Too weak/Too little    ■ Just-About-Right    ■ Too strong/Too large

**Figure 3 – JAR evaluations (%) for Kitoza samples and Portuguese sausage**

## Results - Consumer Acceptance

Information concerning Madagascar traditional origin - had a **positive impact** on the price consumers stated they were willing to pay for the products.

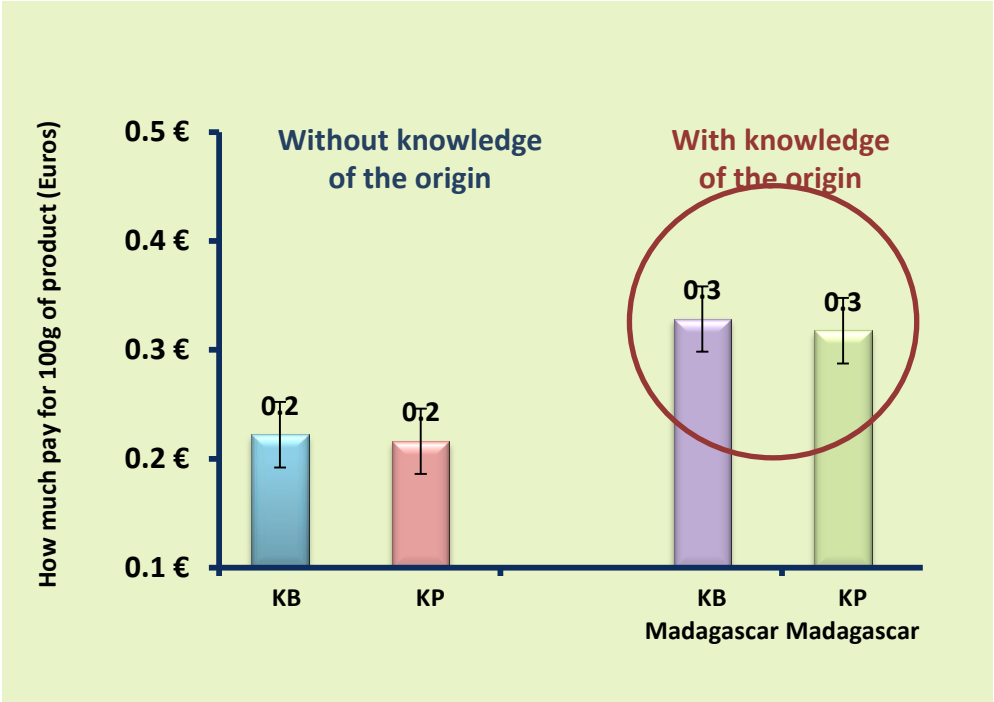


Figure 4 – Mean prices consumers stated they were willing to pay for Kitoza beef and pork, with and without information about the recipes origin (traditional Madagascan). Error bars represent the confidence interval of the mean (p=0,95).

# Conclusions



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KP was more appreciated than KB. Probably these results are due to the fact that most of charcuterie products are made of pork meat in Portugal.

Most consumers would prefer larger product slices and stronger smoked flavour.

The impact of Madagascar traditional origin of the recipe had a positive effect on the price consumers were willing to pay.

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African food tradition revisited by research

## Thank you for your attention Merci pour votre attention



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