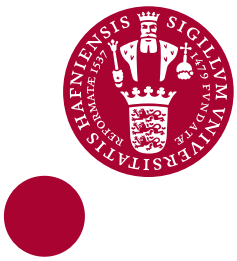

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Product information affects perception of sensory, collative properties and elicited emotions of Indonesian tempe

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Introduction

Consumer perceptions do not only depend on the intrinsic sensory characteristic of the product, but is also influenced by external characteristic of the product. Several studies have demonstrated that information could have a large impact on consumers' perception and liking of food products. In particular, information regarding manufacturing process, processing technologies, brand, and source of food have an effect on consumer perception of some beverages such as apple juice, powdered drink, beer, iced coffee, and pudding[2,3,4,5,8,9,11]. While extant literature presents consumer perception of traditional food[1,6,7,9,10,12] there were very limited information available regarding effect of information on sensory and collative properties of traditional food products, and there is no studies of Indonesian consumers' perception. This study examined the effect of product information on Indonesian consumers perception on sensory and collative properties of tempe (beans that are fermented by mixture of *Rhizopus* spp. molds and bacteria that collating the separated bean into one solid cake-like form) that has different level of modernization. The perceptual collative variable to be measured in this research consists of three component; novelty, complexity, and appropriateness. Novelty is measured by its familiarity, authenticity, traditionality, and typicality. Emotion adjectives to be measured are selected based on the EsSense profile those are related to the product and based on the interview result.
The objectives of this research were to determine the effect of information on sensory and collative properties of tempe as a traditional food product and determine this effect on the consumer segmentation.

Materials and methods

Samples
A total of 9 types of tempe (Figure 1) were chosen for the study including 5 traditionally processed tempe and 4 more modernized versions of tempe. These samples were differed in the raw materials, source of inoculum, processing equipment, and packaging. All tempe samples were sliced to a 4x5x1cm size, marinated in 7% brine solution for 5 minutes prior to frying at 170ºC for 3 minutes. This to conform to one of the traditional method of preparation and consumption.

Figure 1. Nine different fried tempes

Subjects
A total of 175 Indonesian people participated, including 37% men and 63% women, age ranging between 18 and 60.

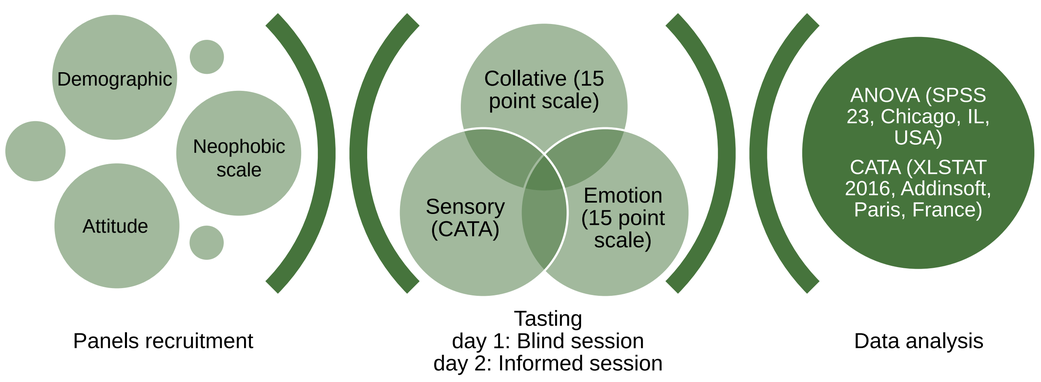

Figure 2. Data collection method and analysis

Results and discussion

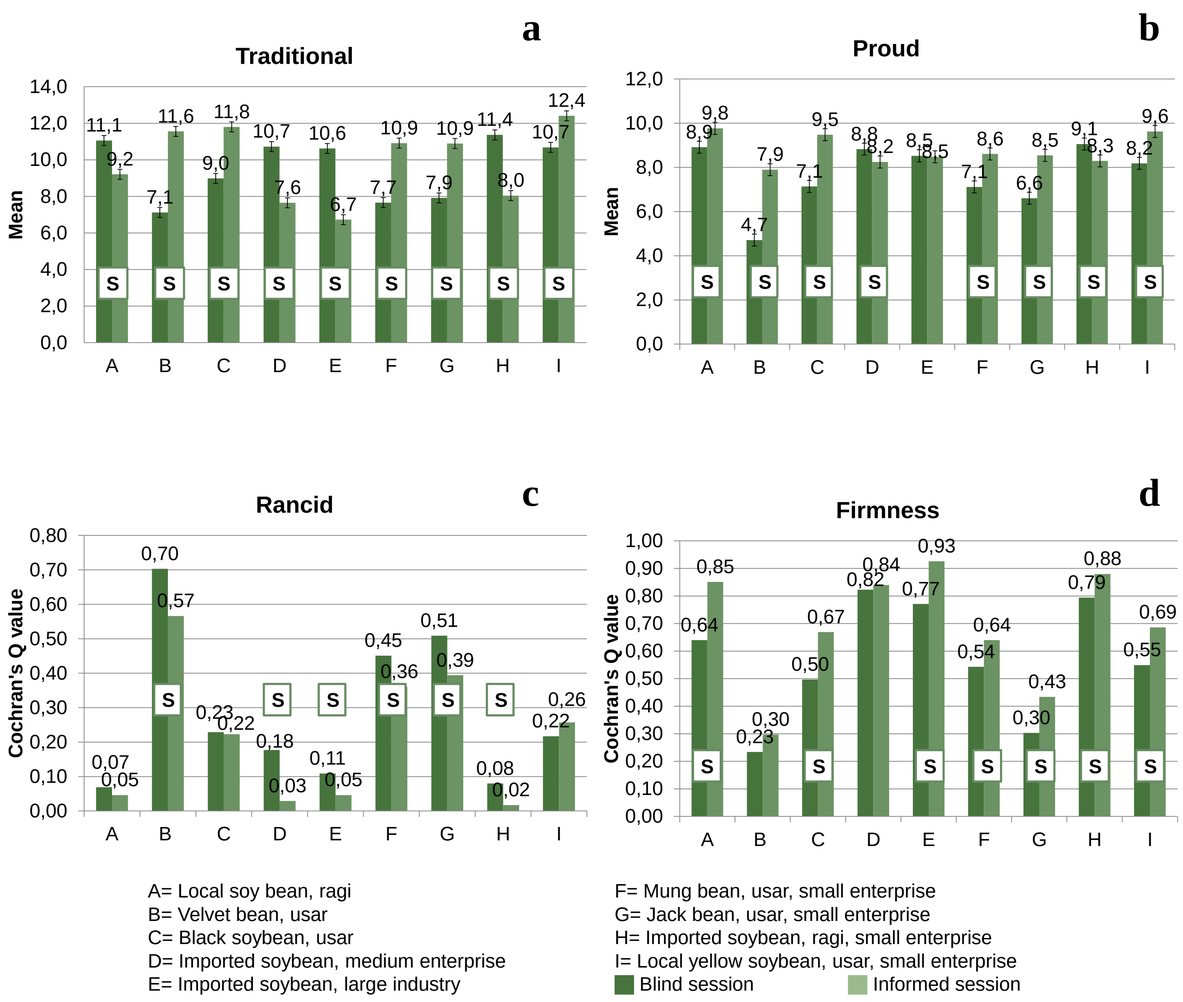

Figure 3. Comparison of blind and informed sessions in the traditional, proud, rancid and firmness perception of different types of tempe. Letter S indicate significant statistical differences in scores.

- The five traditional tempe samples (produced from velvet bean, black soybean, mungbean, jackbean, and local yellow soybean, all inoculated with traditional usar inoculum) have significantly different collative properties when information is provided, especially in regard to perception of traditional (Figure 3a) and authenticity (data not shown).
- The elicited emotions that mostly affected were proud (Figure 3b), pleasant and enthusiastic (data not shown). These emotion perceptions changed mostly on velvet bean and black soybean tempe.
- The five traditional tempe samples are also more liked when the consumer knows the information of the products.
- The perceived sensory properties measured with CATA were affected significantly by the provided information. In particular the rancidity (Figure 3c), firmness (Figure 3d), bitterness, umami, and savory were affected. (Data of the other three sensory perception were not shown).
- Surprisingly, the soy-based tempe samples changed substantially in sensory perception, as a result of the production methods, where the traditional was most different from partly modernized and fully modernized.
- However, interaction is not systematic whether on bean or production type. Information changed the perception on sensory and collative properties of the products.

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Conclusions

The results demonstrate the powerful effect of transparency regarding the products' provenience and production methods. Information about raw materials, source of inoculum, processing equipment, and packaging of the tempe has a significant effect not only on the hedonic response, but also on sensory and collative properties of the product, even after it is cooked. It is important to highlight that the non-soybean tempe samples were significantly better liked under an informed condition; even though soybean tempe is still the most liked both in blind and informed conditions.
The findings of this study help traditional food producers to understand how information affect Indonesian consumers' perception on the sensory properties and the collative properties of the products. Information increases the value of the product, more over for the consumer segment who has a positive attitude towards traditional foods.
The results show the importance of consumer education and information to preserve or maintain the diversity of the food we eat. The insight gained in this study will expand the body of knowledge on consumer perception of traditional product that has been modernized.

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Appendix

Table 1. p value of hedonic response, collative properties and elicited emotions that are affected by the product information (ANOVA)

Collative attributes	Information	Sample x session	A	B	C	D	E	F	G	H	I
Hedonic response	0,000	0,021	-	S	S	S	S	S	S	-	-
Familiar	0,049	0,000	-	S	-	-	-	S	-	-	-
Authentic	0,000	0,000	-	S	S	S	S	S	S	S	S
Traditional	0,008	0,000	S	S	S	S	S	S	S	S	S
Typically tempe	0,000	0,000	-	S	S	-	-	S	S	S	S
Complex	0,000	0,602	-	S	S	-	-	S	-	-	S
Appropriateness	0,000	0,000	S	S	S	-	S	S	S	-	S
Nostalgic	0,000	0,000	-	S	-	-	-	-	-	-	-
Brings memories	0,000	0,005	-	S	S	-	-	-	-	-	S
Happy	0,000	0,001	-	S	S	-	S	S	S	-	S
Bored	0,079	0,202	-	-	S	-	S	-	-	S	-
Worried	0,189	0,000	-	S	S	-	-	S	-	S	-
Proud	0,000	0,000	S	S	S	S	-	S	S	S	S
Pleasant	0,000	0,010	S	S	S	-	S	S	S	-	S
Satisfied	0,000	0,000	-	S	S	-	S	S	S	-	S
Enthusiastic	0,000	0,001	-	S	S	-	S	S	S	S	S

(-) Means not significant at alpha 0.05; (S) means significantly different between blind and informed session at alpha 0.05

Table 2. Sensory attributes that are affected by product information (Cochran's Q test)

Sensory attributes	A	B	C	D	E	F	G	H	I
Rancid	-	S	-	S	S	S	S	S	-
Buttery	-	-	-	-	S	-	-	-	S
Grass	-	-	-	-	S	-	-	S	S
Mushroom-like	-	-	-	S	-	-	-	-	-
Boiled potato	-	S	-	-	-	-	-	-	-
Earthy	-	S	-	S	S	-	-	S	-
Nutty	-	S	S	-	-	-	-	S	S
Compact	-	-	-	-	-	S	-	S	-
Savory	S	S	-	S	S	S	-	-	-
Chewy	S	-	-	S	S	-	-	-	-
Soapy	-	-	-	-	-	-	S	-	-
Umami	-	S	S	S	S	-	S	-	-
Bitter	-	S	S	S	S	-	-	-	S
Oily	-	S	-	-	-	-	-	-	-
Firm	S	-	S	-	S	S	S	S	S
Salty	-	-	-	-	-	S	S	-	-
Sour-smell	-	-	-	-	-	-	-	-	S
Sour-taste	-	-	-	S	-	-	-	-	-

(-) Means not significant at alpha 0.05; (S) means significantly different between blind and informed session at alpha 0.05

A= Local soy bean, ragi
B= Velvet bean, usar
C= Black soybean, usar
D= Imported soybean, medium enterprise
E= Imported soybean, large industry
F= Mung bean, usar, small enterprise
G= Jack bean, usar, small enterprise
H= Imported soybean, ragi, small enterprise
I= Local yellow soybean, usar, small enterprise