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The holistico-reductionist Siga classification according to the degree of processing : A tool for thinking, optimizing food for health.

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OBJECTIVES

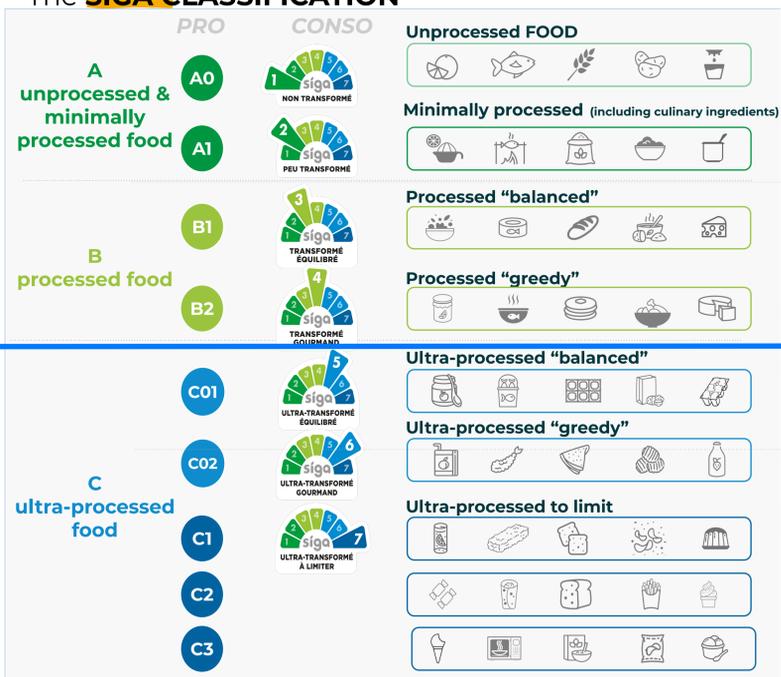
How can Siga tools be used to improve the quality of the food offered to consumers ?

CONTEXT

Between 2010 and 2019, more than 50 epidemiologic studies found positive associations between consumption of ultra-processed foods and the development of chronic diseases. The qualitative NOVA classification of foods according to their degree of processing is widely used worldwide by researchers, and also recognized by several international institutions (FAO, WHO, UNICEF, PAHO...). NOVA defines ultra-processed foods (UPFs) by the presence of processed industrial ingredients and/or additives to modify the sensory properties (aroma, taste, colour and texture) of the reconstituted foods, called 'cosmetic' compounds since modifying the appearance of foods. Some drastic processes directly applied to food are also markers of ultra-processing (MUPs). However, in the intent to develop an elaborated tool for manufacturers, retailers and communities the Siga classification was developed by combining the four holistic NOVA groups with four new more reductionist subgroups considering the impact of processing on the food/ingredient matrix; the contents of added salt, sugar and fat; the nature, number and potential health risk of MUPs.

MATERIELS & METHODS

The SIGA CLASSIFICATION



List of ingredients and nutritional table

The SIGA DEFINITION of Ultra Processed Foods (UPF)

Degree of processing	Substance assessed at risk	Nutritional thresholds
<ul style="list-style-type: none"> Unprocessed FOOD Minimally processed (including culinary ingredients) Processed "balanced" Processed "greedy" 	No MUP	<ul style="list-style-type: none"> Not taken into account Low High
<ul style="list-style-type: none"> Ultra-processed "balanced" Ultra-processed "greedy" 	<ul style="list-style-type: none"> Only one MUP1 (Additive [A] or No Additive [NA]) 	<ul style="list-style-type: none"> Low High
<ul style="list-style-type: none"> Ultra-processed to limit 	<ul style="list-style-type: none"> Limitation of the number of A or NA MUP1 Presence of A or NA MUP1 Possible presence of A or NA MUP2 	<ul style="list-style-type: none"> Possible presence of substances evaluated at risk Not taken into account

UPFs are characterized by the presence of at least one deliberately added substance named Marker of Ultra-Processing (MUP) obtained by synthesis or by a succession of physical, chemical and/or biological processes leading to its purification and/or substantial deterioration compared to the original material in the list of ingredients. UPFs can also be created by the direct application of a deteriorating process (e.g., extrusion-cooking) to the food matrix.

Davidou et al., 2020, "The holistico-reductionist Siga classification according to degree of food processing: An evaluation of ultra-processed foods in French supermarkets". Food & Function. DOI: 10.1039/C9FO02271F

- 30 000 foods representing 10 categories
 - A) Siga scores distribution of packaged food supply of French supermarket
 - B) Caractéristic of UPFs (number and nature of main MUP [additives-A-MUP or Non Additives - NA-MUPs],
 - C) AUT vs the french Nutriscore.
- Analysis of Retailer gingerbread recipe MUP detection and reformulation

RESULTS

1A % of UPF in packaged food supply of French supermarket

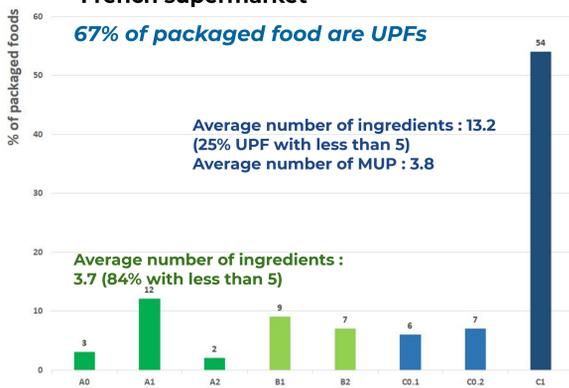


Fig 1 : Distribution of packaged foods marketed in France according to the degree of processing with the Siga technological groups. C1 = UPF C1 to C3

1B MUP Analysis in UPFs

In UPF (C01 to C3), NA-MUP/A-MUP = 1,3

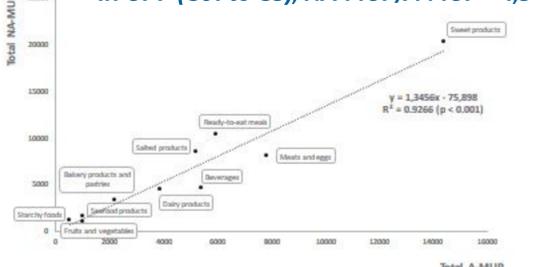
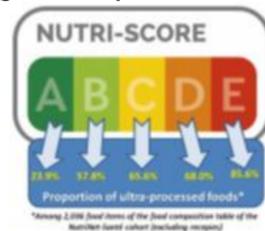


Fig 2 : Correlation between total A-MUPs and total NA-MUPs among the 10 food categories.

Main MUP presents in UPFs are NA-MUP (30% more)- A way to clean Tags?

1C Vision of the french nutritional score through the scope of Ultra-Processing



NA-MUP/A-MUP 1,6 1,5 1,3 1,1 1,2

Main NA-MUP leading to a score improvement

- Plant protein isolates
- Fibers
- Protein isolates
- Fibers
- Protein isolates

41% * or 50% (siga database) of food nutritionally balanced (A and B) are UPFs.

They contain more NA-MUP (1.5) than the packaged food on average (1.3).

15% of foods scored A and B with Nutri-score contains at least one added MUP that improves the score.

Fig 3 : Relation between Ultra Processing and French Nutri-Score*, nature of MUP (additives-A or non additives- NA) and the main NA-MUP present in each score category. *Srouf et al., 2019 Ultra-processed food intake and risk of cardiovascular disease: prospective cohort study (NutriNet-Santé), BMJ ;365:11451

SWITCH ON FOOD RECIPE

1st actionable FOOD PROCESSING CLASSIFICATION

A- MUP1 NA-MUP1 A-MUP2 NA-MUP2 Risk Additives

BEFORE C3 ULTRA-TRANSFORMÉ A LIMITER

LIST OF INGREDIENTS : Glucose-fructose syrup, rye flour, sodium carbonate, black pepper, Honey, ammoniacal caramél, salt from Guérande, cinnamon, diphosphates, flavors.

Fat : 0.9 g/100g Sugars : 38.9 g/100g Salt : 1 g/100g

AFTER B2 TRANSFORMÉ GOURMAND

Category soft cake

LIST OF INGREDIENTS : Honey, rye flour, whole eggs, wheat flour, egg yolks, salt from Guérande, spices (anise, black pepper, cinnamon), sodium carbonate.

Fats : 2.7 g/100g Sugars : 49 g/100g Salt : 0.7 g/100g

No more MUP (A or NA) and risk additives in the new recipe for this process food

CONCLUSION

For improvement of food quality, decrease use of Non Additives MUP and not only additives.

Hierarchize food scoring, and to apply first holistic indices, then compositional scores, not the contrary, to avoid an undue valorisation of UPFs towards consumers.

Use of Siga tools for recipe improvement in industry

Work with other food distributors (schools, hospitals...).