The SENS* adapted from the French SAIN, LIM nutrient profiling system classifies foods into 4 ordered classes

*Systeme d’Etiquetage Nutritionnel Simplifie (Simplified nutritional labelling system)

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INTRODUCTION

The European Regulation No 1169/2011 (FIC) allows simplified labels to help consumers make healthier food choices. Such labels are based on algorithms, such as the SAIN, LIM, initially developed by the French Food Safety Agency in 2008, which classifies foods into 4 classes, according to their nutritional quality.

OBJECTIVES

To describe the adaptation of the SAIN, LIM system into the SENS, an algorithm operational for simplified nutritional labelling in the EU. This requires to:

- reduce the number of nutrients needed to calculate the profile (especially those which labelling is non-mandatory);
- order the 4 classes,
- integrate the European Daily Reference Intakes (DRIs);
- consider the nutritional specificities of some food categories.

MATERIALS AND METHODS

Changes to the original SAIN, LIM algorithm followed a step-by-step process. At each step, one or two changes were introduced and changes induced in the classification were interpreted. A steering committee, including members of French food retailers and industries, participated in the development of the SENS, which was implemented by a scientific working group who decided and tested the adaptations, with respect to the principles of integrity and transparency. This collective approach is in line with WHO report “What works” and with FIC regulation which both promote multi-stakeholders and participative interventions or “consultation with a wide range of stakeholder groups”.

RESULTS

From the SAIN, LIM system ...

- The SAIN, LIM system = the French nutrient profiling system.
- SAIN score = mean of the % adequacy with the French recommended intakes for 5 desirable nutrients (proteins, fibers, vitamin C, calcium, iron) for 100 kcal.
- LIM score = mean % of the maximal recommended values for 3 nutrients to be limited (sodium, added sugars, and Saturated Fatty Acids-SFA), for 100g.
- 19 versions successive adaptations to adapt the SAIN, LIM.

... to the SENS algorithm

\[ \text{LIM}_{\text{SENS}} = \frac{\text{Sodium} \times (\text{mg/100g})}{2400 \times (\text{g/100kcal})} + \frac{\text{SFA} \times (\text{g/g})}{20 \times (\text{g/100kcal})} + \frac{\text{NSugar} \times (\text{g/100kcal})}{50 \times (\text{g/100kcal})} \times 100 \]

\[ \text{SAIN}_{\text{SENS}} = \frac{\text{ALA} \times (\text{mg/100kcal})}{1.8 \times (\text{mg/100kcal})} + \frac{\text{MUFA} \times (\text{g/100kcal})}{44.4 \times (\text{g/100kcal})} \times 100 \]

\[ \text{SAIN}_{\text{SENS}} = \frac{\text{F&V} \times \text{Vit C} \times \text{mg/100kcal}}{10 \times (\text{mg/100kcal})} \times \frac{\text{mg/100kcal}}{0.4 \times \text{mg/100kcal}} \times 100 \]

\[ \text{SAIN}_{\text{SENS}} = \frac{\text{F&V} \times \text{Proteins} \times \text{mg/100kcal}}{10 \times (\text{mg/100kcal})} + \frac{\text{Fibres} \times \text{g/100kcal}}{50 \times (\text{g/100kcal})} + \frac{\text{NutCat}\times \text{Weight} \times \text{g/100kcal}}{20 \times (\text{g/100kcal})} \times 100 \]

Table 1. Specific nutrients by food categories (NutCat), reference values (RefNutCat) and weighting coefficient (Weight)

<table>
<thead>
<tr>
<th>Food category</th>
<th>NutCat</th>
<th>RefNutCat</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals (&gt;50%)</td>
<td>Fibres</td>
<td>20 g</td>
<td>2</td>
</tr>
<tr>
<td>Cheese (&gt;70%)</td>
<td>Calcium</td>
<td>800 mg (EU-DRI)</td>
<td>2</td>
</tr>
<tr>
<td>Other dairy products (&gt;50%)</td>
<td>Calcium</td>
<td>800 mg (EU-DRI)</td>
<td>1</td>
</tr>
<tr>
<td>Eggs (&gt;50%)</td>
<td>Proteins</td>
<td>50g (EU-DRI)</td>
<td>1</td>
</tr>
<tr>
<td>Fish (&gt;50%)</td>
<td>Proteins</td>
<td>50g (EU-DRI)</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>except fats and beverages</td>
<td>Zero</td>
<td>NA</td>
</tr>
</tbody>
</table>

Thresholds’ definition to order the four SENS classes

Primary thresholds:
- SAIN\text{SENS} = 5 (corresponding to 100% adequacy)
- LIM\text{SENS} = 7.5 (corresponding to 0% excess)

Secondary thresholds:
- SAIN\text{SENS} = 2; 3.5; 7.5; 10; 15;
- LIM\text{SENS} = 10; 15; 35; 50;

Exception: Water is the only beverage in Class-1:
For Water, LIM\text{SENS} = 0 and SAIN\text{SENS} is infinite
Other Class-1 beverages are downgraded in Class-2 (e.g. diet-sweet beverages)

Exception: Downgrading high energy-dense foods (fats not concerned):
- from 1 to 2 if > 400kcal/100g
- from 2 to 3 if > 400kcal/100g
- from 3 to 4 if > 500kcal/100g AND Na>200mg/100g

Food mapping according to SAIN\text{SENS} , LIM\text{SENS}

The SENS was used to classify 1192 foods from the French Food Composition table (CIQUAL) and 1737 real food products, marketed in 2015 in France.

Overall, the classification was in line with the French dietary guidelines and recommendations and discriminated adequately within and across food groups to provide a potentially useful help for consumer’s food choices.

CONCLUSIONS

The SENS system preserves the strengths of the initial SAIN, LIM system while making it more operational, taking into account specificity of food categories, complying with European DRIs, and finally extending its use for simplified nutritional labelling.

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