

# Transition towards vegetarian meals in school canteens in France: what does a conjoint assessment of nutritional and environmental impact, and acceptability by children and their parents tell us?

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- A paying service proposed to parents by public institutions, with a wide array of directives in order to address
  - Nutritional composition
  - Environmental impact

  
 JORF n°0229 du 2 octobre 2011 page 16575  
 texte n° 34

### Critères Fréquentiels Obligatoires en Restauration Scolaire depuis 2011

1	Entrées de crudités, légumes ou fruits	10/20 min
2	Entrées $\geq 15\%$ lipides	4/20 max
3	Féculents	= 10/20
4	Légumes cuits (50% min)	= 10/20
5	Produits à frire $> 15\%$ lipides	4/20 max
6	Viandes non hachées de boeuf, veau, agneau, ou abats	4/20 min
7	Poisson P/L $\geq 2$ ; $\geq 70\%$ poisson	4/20 min <sup>1</sup>
8	Plats Protidiqes P/L $\leq 1$	2/20 max <sup>2</sup>
9	Plats $< 70\%$ du grammage recommandé de viande, œuf ou poisson	3/20 max
10	Produits Laitiers Ca/portion $\geq 150$ mg	8/20 min
11	Produits Laitiers Ca/portion $\leq 150$ mg et $\geq 100$	4/20 min
12	Pdts Laitiers/ desserts lactés $\geq 100$ mg Ca/portion et $< 5$ g lip/portion	6/20min
13	Desserts de fruits crus	8/20 min
14	Desserts $> 15\%$ lip et $> 20$ g glucides simples totaux	3/20 max
15	Desserts $< 15\%$ lip et $> 20$ g glucides simples totaux	4/20 max

→ 15 critères au total      [Courtesy: Nicole Darmon](#)

<sup>1</sup> poissons gras exemptés, <sup>2</sup> œufs exemptés



- Vegetarian meals: a new legal constraint
  - Egalim directive, 2019: experimental
  - Climat & Résilience directive, 2021: mandatory
- In addition to other regulatory measures towards a more sustainable offer:
  - $\geq 50\%$  of the offer (in €) should be constituted of food products with quality indicators (e.g., PGI)
  - Among which  $\geq 20\%$  organic

- Environmental impact
- Adequacy to children's nutritional needs
- Acceptability by children
- Acceptability by parents
  
- => A case study in Dijon, France





Source : [www.bienpublic.com](http://www.bienpublic.com)



Source : [www.dijoncestcapitale.fr](http://www.dijoncestcapitale.fr)

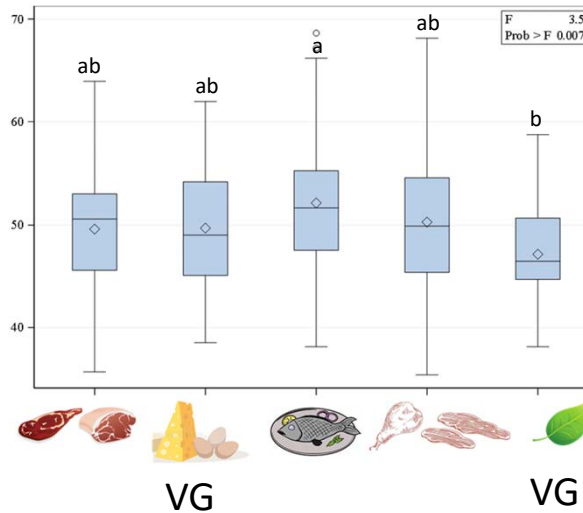


Source : [www.dijon.fr](http://www.dijon.fr)

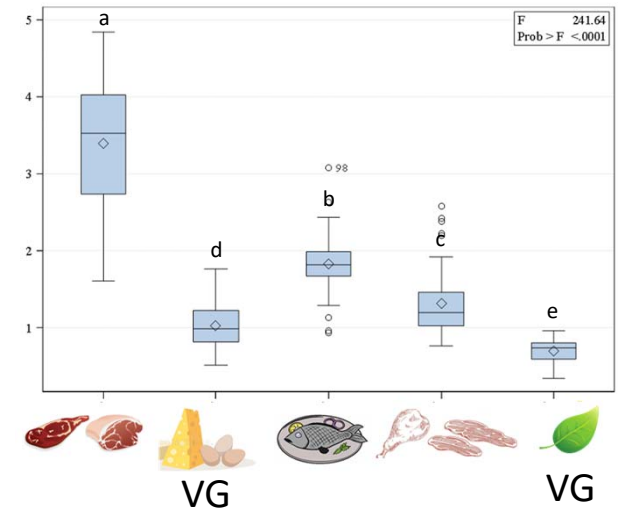
- 1 central kitchen (cold link)
- 8 000 meals/day
- 49 staff members
- Satellite restaurants : 39 preschools, 38 primary schools
- Children help themselves (*except Covid*)
- ~ 750 staff members (service and animation)
- Social cost\* applied to families (\*indexed on parental income)
- Average cost to families : 3.36 € per meal



**Nutritional quality**  
Mean adequacy ratio (%)



**Environmental impact**  
GHGEs (kgCO<sub>2</sub>eq)



➔ Vegetarian school meals are of good nutritional quality  
➔ Vegetarian school meals are of low environmental impact

frontiers | Frontiers in Nutrition

TYPE Original Research  
PUBLISHED 10 October 2022  
DOI 10.3389/fnut.2022.997144

Check for updates

**Nutritional quality and greenhouse gas emissions of vegetarian and non-vegetarian primary school meals: A case study in Dijon, France**

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SPECIALTY SECTION

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Springer

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Romane Poinsot · Florent Vieux · Matthieu Maillot · Nicole Darmon



**For all menus:**

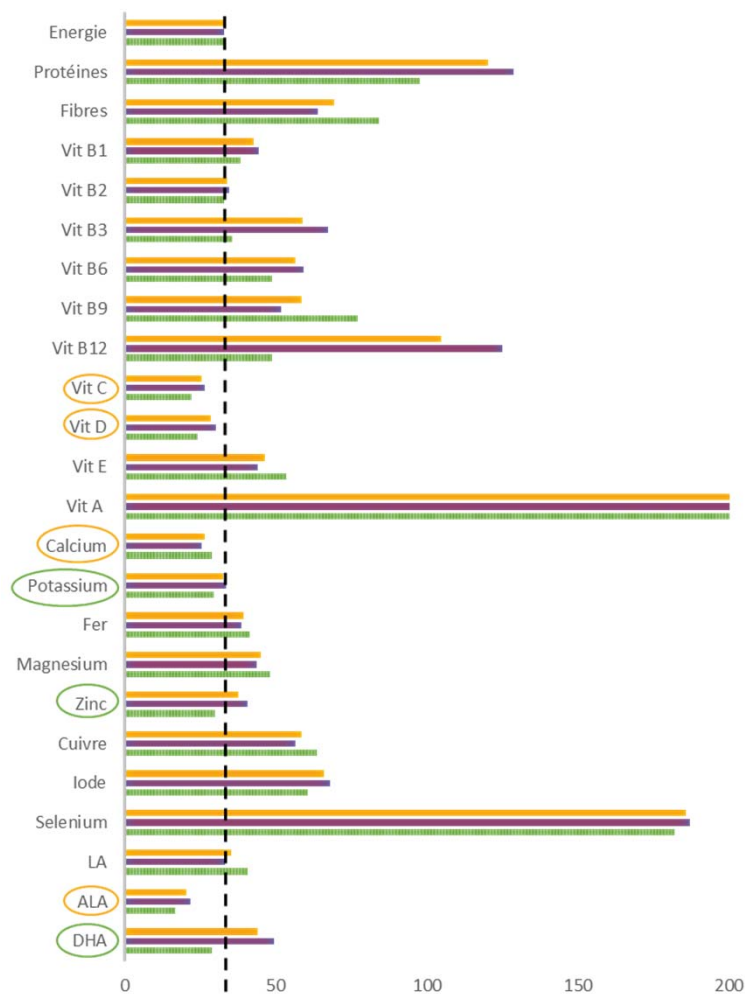
19 of 23 nutrients are in satisfactory amounts ( $\geq 33\%$ ).

**For non-vegetarian menus:**

Insufficient ( $< 33\%$ ) coverage of nutritional requirements for calcium, ALA, vit C, and D.

**For vegetarian menus:**

Coverage of nutritional requirements is insufficient ( $< 33\%$ ) in potassium, zinc, and DHA..



- : All menus
- : Non-vegetarians
- : Vegetarian

- - - : threshold of **33%** corresponding to the energy needs covered by one meal

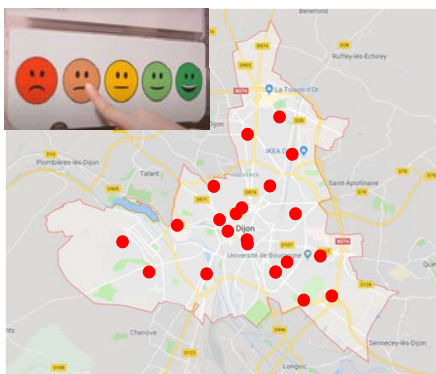
% RDI



April – May 2021

June 2021

September 2021 – June 2023



### 38 feedback devices

All primary schools  
Inside the canteen buildings  
Staff information and training

### Validity studies

**Reliability**  
3 questionnaires  
**External validity**  
1 questionnaire

### “How much did you like the meal today?”

Everyday right after lunch  
All children in primary schools (~4000/day)  
Main dish only





Mixed model (proc mixed, SAS) : liking = protein dish type + side dish type + school restaurant (random)

Fixed effects fixes (Type III)	F	Pr > F
Protein dish	0,16	0,687
Side dish	169,3	< 0,001

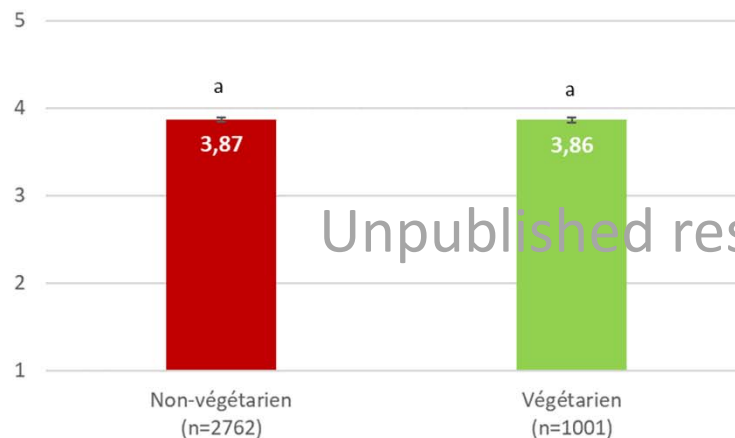
**Protein dish :**

- Non-VG (n=91)
- VG (n=33)

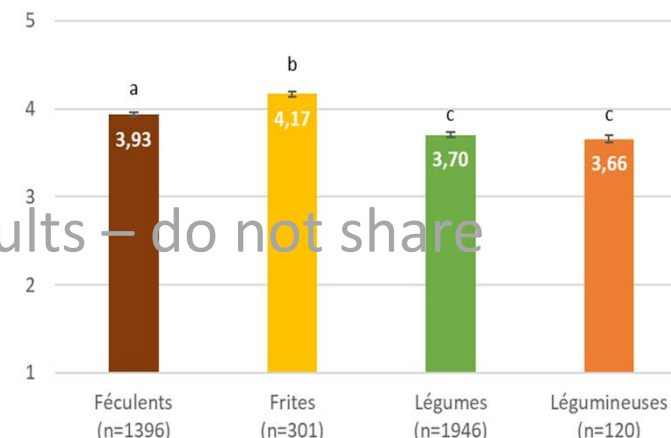
**Side dish :**

- Starch (n=46)
- Fries (n=10)
- Pulses (n=4)
- Vegetables (n=64)

Liking by protein dish type



Liking by side dish type



Unpublished results – do not share

Les moyennes avec des lettres différentes sont différentes au seuil  $\alpha = 5\%$

➔ Children like vegetarian dishes as much as non-vegetarian dishes

Data Sept 21 – June 22



Mixed model (proc mixed, SAS) : liking = protein dish type + side dish type + school restaurant (random)

Fixed effects fixes (Type III)	F	Pr > F
Protein dish	19,6	< 0,001
Side dish	181,7	< 0,001

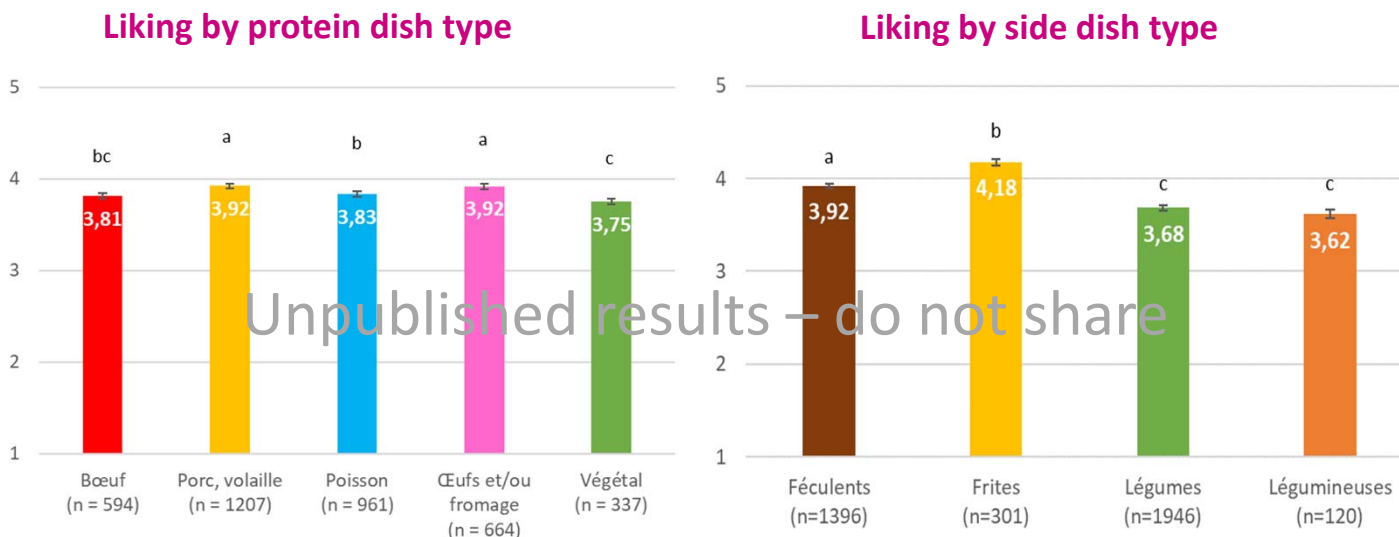
**Protein dish :**

- Beef (n=15)
- Pork, poultry (n=32)
- Fish (n=23)
- Eggs and/or cheese (n=16)
- Vegetal (n=7)

**Side dish :**

- Starch (n=46)
- Fries (n=10)
- Pulses (n=4)
- Vegetables (n=64)

Data Sept 21 – June 22



Unpublished results – do not share

Les moyennes avec des lettres différentes sont différentes au seuil  $\alpha = 5\%$

➔ Children like especially vegetarian dishes with eggs&cheese



# What do parents want?

- Project to offer a 2<sup>nd</sup> optional VG meal > January 2023
- Estimation of parental willingness to opt for
  - This 2<sup>nd</sup> optional VG meal
  - An optional VG meal everyday
- On line survey sent to all parents Sept-Nov 22
- 50% of parents would opt for a 2<sup>nd</sup> VG meal per week
- 28% of parents would opt for a VG option every day

Unpublished results – do not share



- VG meals are of equivalent nutritional quality, and emit much less CO2 eq. than non vegetarians meals
- Children enjoy as much VG meals as non vegetarians meals
  - They like meals with eggs&cheese dishes slightly more than vegetal meals
- Half of parents would opt for a 2<sup>nd</sup> vegetarian meal / week, and 28% for a vegetarian option everyday
- Barrer to implementation:
  - Attitudes of some staff members
  - Willingness to go beyond the national directives by politician decision-makers
  - « Vegetarism » became a political topic
  - Hard to bring the debate back to rationality



**The feedback devices:  
A tool for steering the food transition**



Daily analysis of the appreciation of new recipes  
Data transmitted to the cooks

**Perspective :**  
**Study the correlation between food liking and  
food waste data**

**Taste and food education:  
A lever for the food transition**



The **pleasure of eating** is built  
through food experiences  
Three dimensions that can be mobilized during  
interventions: **sensory, cognitive, interpersonal**

**Perspective :**  
**Evaluate the impact of a taste and nutrition  
education program on children's liking of canteen  
dishes**





Thank you for your attention

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Thanks to our funding bodies

