

Development of a methodological document for the comparison of alternatives to hazardous substances

2nd International Symposium on Alternatives Assessment



Geoffrey Argiles - Unit for Assessment of chemical substances - Risk Assessment Department
French Agency for Food, Environmental and Occupational Health & Safety (Anses)

Purpose of the request

5 French Ministries

(Environment, Labour, Health,
Agriculture, Consumer affairs)



Formal request

Opinion on the possibility of formaldehyde substitution in various
sectors of activity



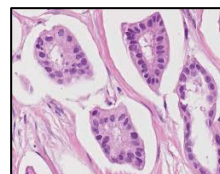
Embalming
processes



Animal feed



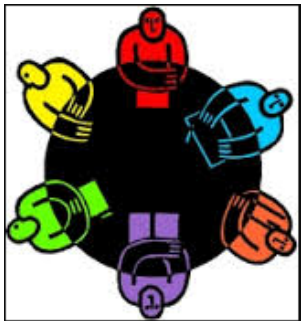
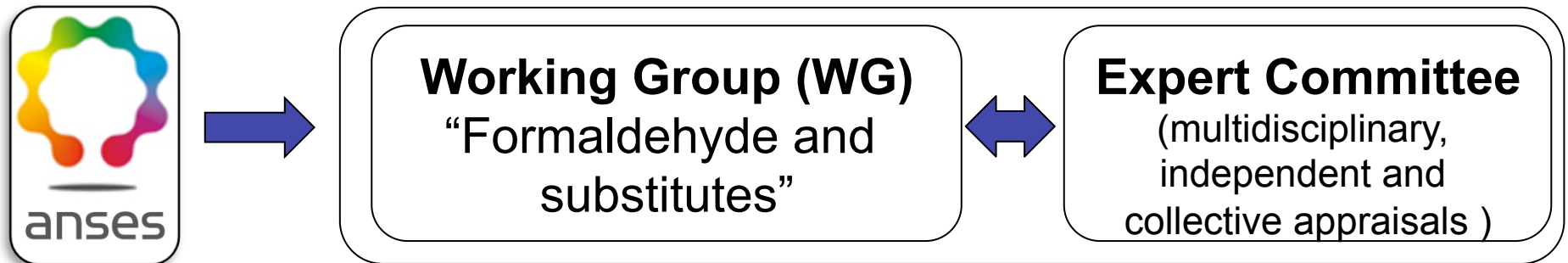
Pathological
anatomy and
cytology



Food for
human
consumption



Answering of the request



The Working Group :

1. Development of a method to compare alternatives
2. Implementation in the various sectors of activity

General description of the method

Identification of alternatives through a search in the scientific literature
Consultation of stakeholders in the sector of activity



1st sequential step

« Technical performance » module



« Regulation » module



« Hazard » module - Rapid hazard assessment using QCAT tool

Exclusion of non-performing alternatives regarding technical performance criteria retained as essential

Exclusion of alternatives prohibited via regulations

Exclusion of substitutes graded F by the QCAT tool



List of 6 to 10 alternatives graded A, B, C or « not assigned » and fulfilling the technical performance criteria retained as essential

General description of the method

List of 6 to 10 alternatives graded A, B, C or « not assigned » and fulfilling the technical performance criteria retained as essential



2nd simultaneous step



« Hazard » module

In-depth
assessment of the
hazards using
GreenScreen tool



« Estimation of substitution cost » module

Study of the direct and
indirect costs of
substitution



« Exposure conditions » module

Evaluation of the
exposure conditions



« Other impacts » module

Module to be
defined for each
sector of activity



Comparative study of alternatives on the basis of available data

General description of the method

Class 1	Insufficient technical performance
Class 2	Inferior technical performance
Class 3	Equivalent technical performance
Class 4	Superior technical performance
Not assigned	Not assigned due to insufficient data

Class 1	High exposure conditions
Class 2	Moderate exposure conditions
Class 3	Low exposure conditions
Class 4	Exposure conditions considered negligible
Not assigned	Not assigned due to insufficient data

**Technical
Performance**

Hazard

**Exposure
conditions**

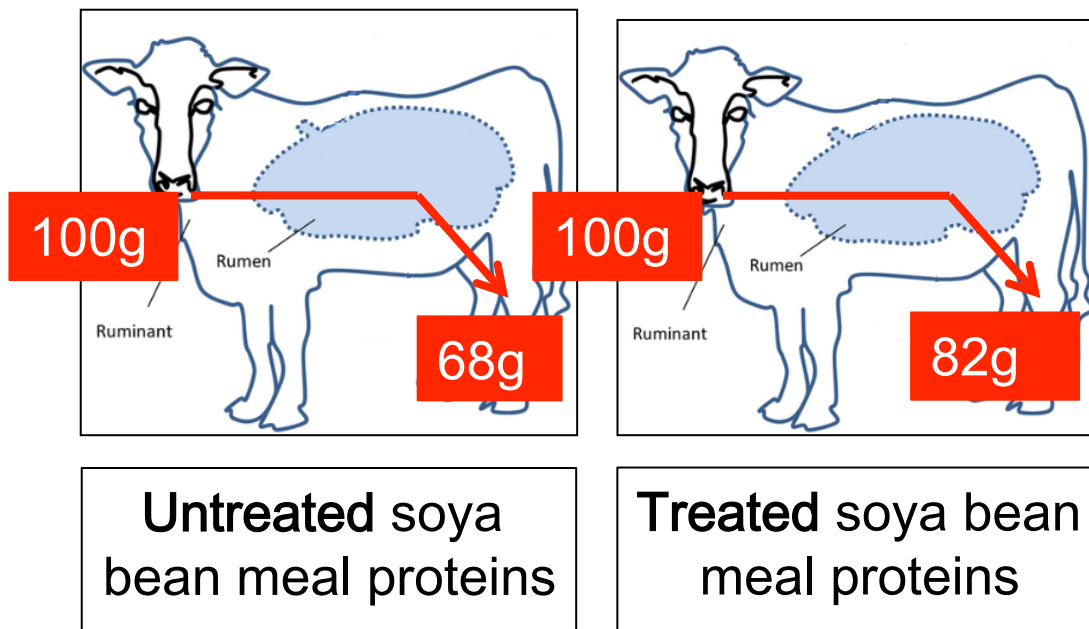
**Substitution
cost**

Hazard class 1	Extremely hazardous chemical substance
Hazard class 2	Very hazardous chemical substance
Hazard class 2 _{DG}	Very hazardous chemical substance due to missing data
Hazard class 3	Hazardous chemical substance
Hazard class 3 _{DG}	Hazardous chemical substance due to missing data
Hazard class 4	Low hazard chemical substance
Not assigned	Not assigned due to insufficient data

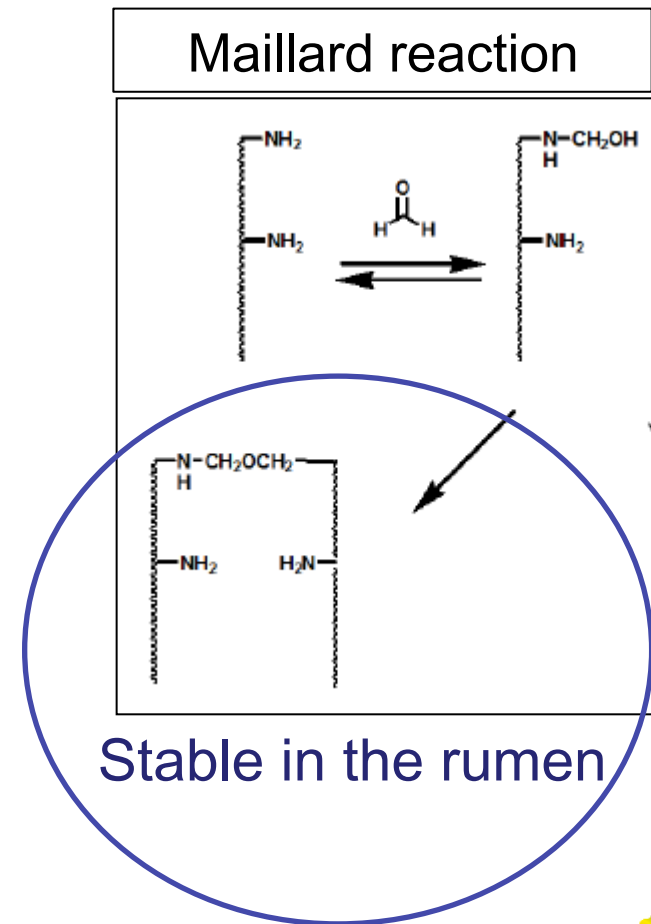
Class 1	Highest related costs
Class 2	Moderate related costs
Class 3	Low related costs
Class 4	Lowest related costs
Not assigned	Not assigned due to insufficient data

Implementation in animal feed

Formaldehyde is used as a processing aid for protection against ruminal degradation



Formaldehyde treatment decreases ruminal degradation



Implementation in animal feed

1 st sequential step	Technical performance module	Regulation module	Hazard module QCAT tool
Formaldehyde	Class 3	Substitution mandatory (OSH regulation)	F (extremely hazardous)
Isopropanol; Ethanol; n-Propanol Glutaraldehyde; Glyoxal; Tannins; Essential oils; Zinc sulfate; Propionic Acid; Steaming	Not assigned (lack of data) 		
Sodium hydroxyde	Class 2 (inferior)	No exclusion by regulation	B (hazardous)
Extrusion cooking	Class 2 (inferior)		A (low hazard)
Heat treatment with calcium lignosulfonate	Class 3 (equivalent)		Not assigned

Implementation in animal feed

2nd simultaneous step	Hazard module GreenScreen tool	Estimation of substitution cost module	Exposure conditions module	Other impacts module
Formaldehyde	Class 1 (extremely hazardous)	Class 4 (lowest related costs)	Class 3 (low)	
Sodium hydroxyde	Class 2 (very hazardous)	Not assigned (lack of data)	Class 4 (negligible)	Availability; Chemical burns
Extrusion cooking	Class 4 (low hazard)	Class 1 (highest related costs)	Class 4 (negligible)	Thermal burns; Dust emission
Heat treatment with calcium lignosulfonate	Class 3 (hazardous)	Class 4 (lowest related costs)	Class 4 (negligible)	Thermal burns; Dust emission

Results in animal feed

Conclusion of the modules	Formaldehyde	Alternatives		
		Extrusion cooking	Sodium hydroxyde	Heat treatment with calcium lignosulfonate
« Technical performance » module	Class 3	Class 2	Class 2	Class 3
« Hazard » module	Class 1	Class 4	Class 2	Class 3
« Exposure conditions » module	Class 3	Class 4	Class 4	Class 4
« Estimation of substitution cost » module	Class 4	Class 1	Not assigned	Class 4
Identification of « other impacts »		Thermal burns; Dust emission	Availability; Chemical burns	Thermal burns; Dust emission

Conclusions and recommendations

Final presentation of the results

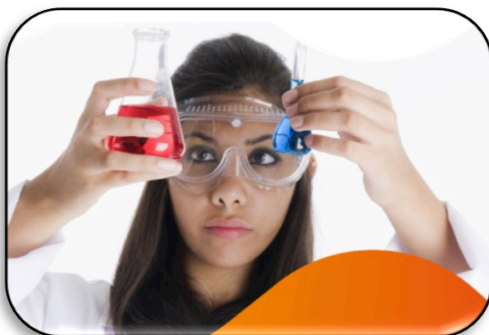
Final tables showing the various alternatives with their advantages and disadvantages to enable the decision-makers to retain the best option in view of the criteria they consider high-priority and acceptable

As existing alternatives process are available

The WG recommends :

- ❖ to the public authorities : to prohibit the use of formaldehyde in animal feed ;
- ❖ to the animal feed manufacturers : to substitute formaldehyde by using an existing alternative process (in particular “extrusion cooking” or “heat treatment with calcium lignosulfonate”).

Useful information about the reports



Link to the method

<https://www.anses.fr/en/system/files/VSR2014SA0236RaEN.pdf>

Embalming
processes

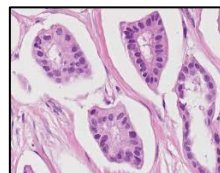


Public consultation : August to
September 2018 - Final report
to be published mid-2019

Animal feed

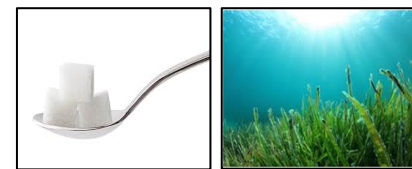


Pathological
anatomy and
cytology



Public
consultation
Dec. 2018

Food for
human
consumption



Public
consultation
mid-2019



Thank you to

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B. Dufeu; L. Fillaudeau; L. Garras;
M. Goliro; P. Lambert; A. Lattes;
S. Le Bouquin-Leneveu; R. Vincent

Anses contributors

D. Brunet, K. Fiore, L. Vérines-Jouin

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