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## Plant nutrients from organic industrial by-products

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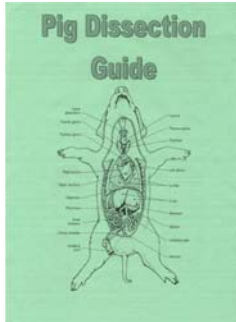
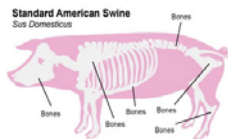
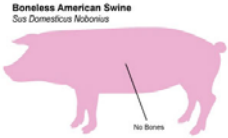


We use everything of the pig but the oink!  
 Dans le cochon, tout est bon sauf le cri  
 Del maiale non si butta via niente  
 Del cerdo se aprovecha todo

But this is true only if we consider the production of fertilisers as well!

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### Pig Dissection Guide

Standard American Swine  
*Sus Domesticus*

Boneless American Swine  
*Sus Domesticus Nobonius*

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BONELESS PIG FARMERS ASSOCIATION OF AMERICA

[www.bonelesspigs.org/bonelesspigs\\_MMH.swf](http://www.bonelesspigs.org/bonelesspigs_MMH.swf)

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## Industrial organic wastes

- Wastes of food preparation:
  - Animal wastes: 13.870.000 t
  - Vegetal wastes: 4.560.000 t
- Textile wastes: 2.500.000 t

Year: 2006 - Source: Eurostat

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## Plant nutrients

	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
• Animal meal	7.5-8.5	12-14	...
• Blood meal	9.0-12.0	...	...
• Leather meal	8.5-13.0	...	...
• Hydrol. proteins	5.0-9.0	...	...
• Molasses vinasses	3.5-7.7	...	2.4-3.2
• Grape vinasses	3.0-3.6	...	1.5-2.0
• Yeast extract	7.2-8.0	...	...
• Antibiotic BP	5.0-9.0	0.5-4.0	0.5-4.0
• Oil cakes	1.2-8.4	...	...

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## May be used for fertiliser?

Plant nutrients, but also

- ✓ Safety
- ✓ Physical properties
- ✓ Alternative uses
- ✓ Availability
- ✓ Cost
- ✓ Processing
- ✓ Regulation

## Safety first

### • Animal diseases

- BSE, TSE, etc.

### • Heavy metals

- Dangerous and indicators

## Safety and ABP

EC Regulation 1774/2002:

- Category 1: all the materials TSE infected or potentially TSE infected;
- Category 2: all the materials potentially infected by diseases different from TSE and manures;
- Category 3: all other animal by-product (ABP)

## Safety and ABP

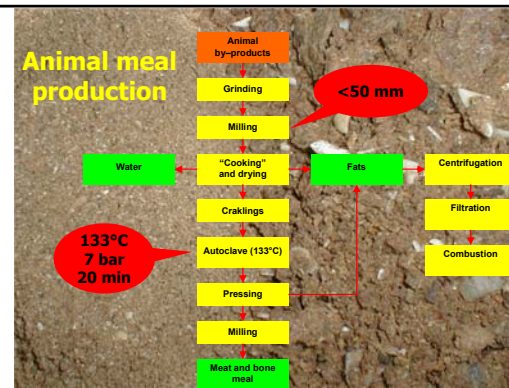
EC Regulation 1774/2002:

- Category 1: all the materials TSE infected or potentially TSE infected;
- Category 2: ~~Destroyed~~ the materials potentially infected by diseases different from TSE and manures;
- Category 3: all other animal by-product (ABP)

## Safety and ABP

EC Regulation 1774/2002:

- Category 1: all the materials TSE infected or potentially TSE infected;
- Category 2: ~~Destroyed (≈10%)~~ the materials potentially infected by diseases different from TSE and manures;
- Category 3: all other animal by-product (ABP) ~~Used (≈90%)~~

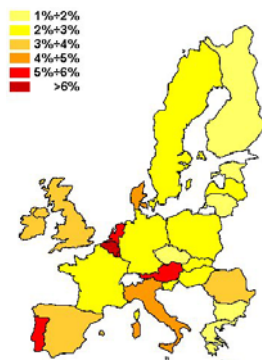


## Potentially, a big resource

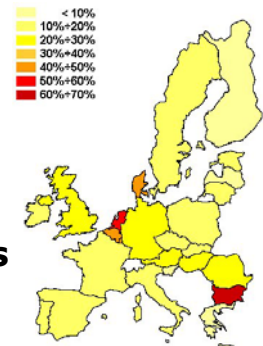
In EU-27, per year:

- Animal by-products: 13.870.000 t
- Animal meal: 4.160.000 t
- Nitrogen: 332.800 t
- P<sub>2</sub>O<sub>5</sub>: 540.800 t
- Energy saving: 15.000.000 GJ
- Value: >1.000.000.000 €

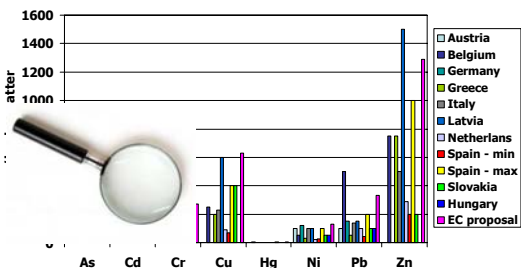
## Potential contribution of animal by-products to Nitrogen requirements in UE



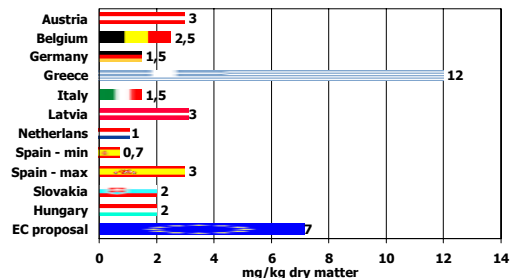
## Potential contribution of animal by-products to P<sub>2</sub>O<sub>5</sub> requirements in UE



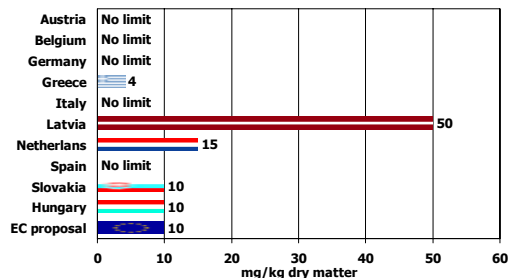
## Maximum values for heavy metals in fertiliser

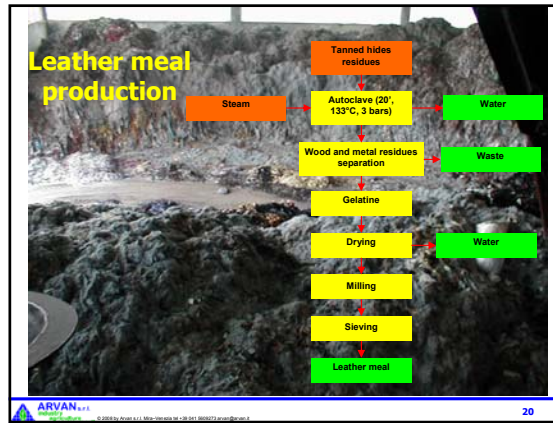
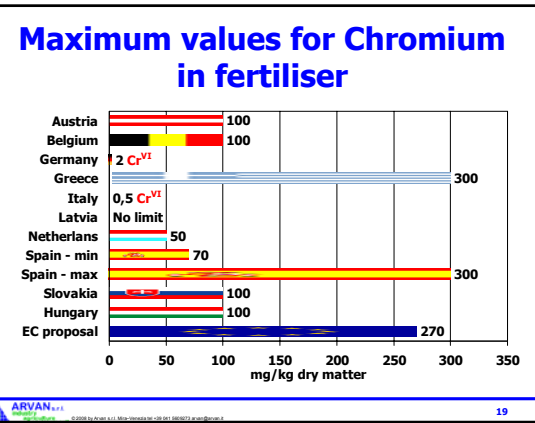


## Maximum values for Cadmium in fertiliser



## Maximum values for Arsenic in fertiliser





### Alternative uses - 1

#### Before BSE

<b>Feedstuffs</b>	<b>Fertilisers</b>
• Animal meals	• Vinasses
• Oil cakes	• Leather

Red arrows indicate flow from Animal meals to Vinasses and from Oil cakes to Leather.

#### After BSE

<b>Feedstuffs</b>	<b>Fertilisers</b>
• Oil cakes	• Animal meals
• Vinasses	• Leather

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### Alternative uses - 2

**Other possible alternatives:**

- Blood → pharmaceutical uses
- Animal meals → energy
- Organic materials → biogas

**No alternative uses:**

- Castor oil cakes (ricinin)
- Fish meal (from skins and bones)

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### Fish meal

#### why a French speciality?

The image shows a man in a market stall with various fish products. To his right is a vintage poster for 'ANGUISAUD' fish meal, featuring a man carrying a large basket of fish. The poster text includes 'AVEC CE CI CELA', 'GUANO DE POISSON FRANÇAIS SUPERGUANO', 'ANGUISAUD', '20 USINES', and 'JODÉ-ANGIBAUD LA ROCHELLE'.

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### But also for the concentration of availability

The image shows two maps of Europe. The left map shows the entire continent with three red stars. The right map shows a more detailed view of the western part of Europe with four red stars, indicating specific regions of interest.

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### How far can be transported? e.g., Vinasse

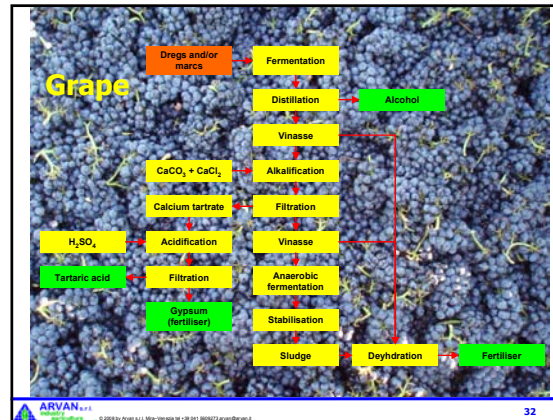
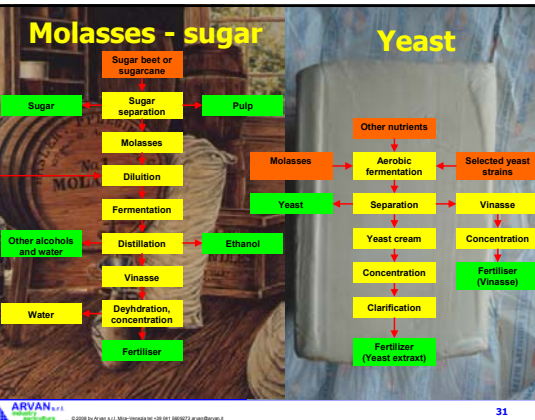
The image shows a tractor spreading a dark material on a field. The word 'No' is written in large red letters over the tractor's path. To the right, the word 'Yes' is written in large black letters, with images of various agricultural products like 'osmo' fertilizer, 'Vinasse extract', and other containers.

ARVAN logo and copyright information at the bottom.

### Vinasses, from several sources

The image is a collage of four images: a wooden barrel labeled 'MOLASSES', a bunch of colorful grapes, a close-up of a wine bottle, and a technical drawing of a distillation apparatus labeled 'Appareil de distillation Agricole'.

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## Different processes

<p><b>Animal by-products</b></p> <ul style="list-style-type: none"> <li>• High temperature</li> <li>• High pressure</li> <li>• Grinding, etc.</li> </ul>	<p><b>Vegetal by-products</b></p> <ul style="list-style-type: none"> <li>• Deyhdration</li> <li>• Concentration</li> <li>• Fermentation</li> </ul>
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## Different costs

- ✓ Alternative uses
- ✓ Availability
- ✓ Pelletising
- ✓ Packaging (if any)
- ✓ Transport
- ✓ Processing

**make the price...  
but also:**

- ✓ Marketing, etc.
- ✓ Raw material cost

22.11.2008 [ EN ] Official Journal of the European Union L 312/3

DIRECTIVES

DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL  
of 19 November 2008  
on waste and repealing certain Directives

**Article 5 (*By-products*)**

A substance or object, resulting from a production process, the primary aim of which is not the production of that item, **may be regarded as not being waste** referred to in point (1) of Article 3 but as being a by-product only if the following conditions are met:

- further use of the substance or object is certain;
- the substance or object can be used directly without any further processing other than normal industrial practice;
- the substance or object is produced as an integral part of a production process; and
- further use is lawful, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

## A negative cost

- 1) Material processed directly by the **producer** (e.g. vinasses or antibiotic byproducts): the only alternative is almost always disposal as a waste;
- 2) Material processed by a **third party** by law (animal by-products) and/or for the need to improve its characteristics (leather by-products): the producer of the 'waste' has to pay the processor and this money can cover, totally or partially, the treatment costs

