



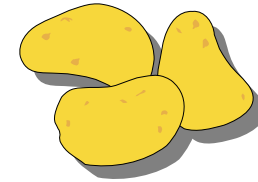
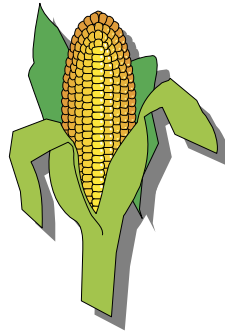
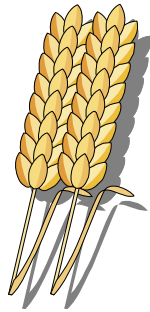
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By-products from the EU starch industry :

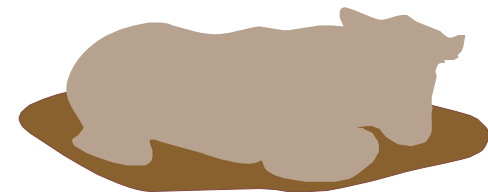
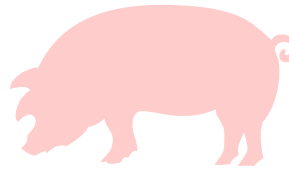
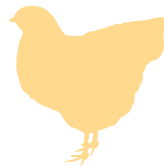
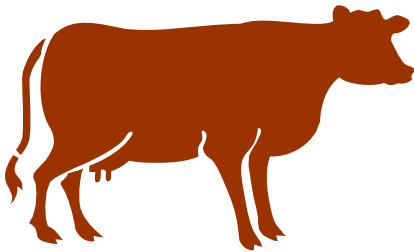
**Valuable and safe ingredients for
animal feeding**

14 September 2006 – IRWM workshop

In Europe, starch products are made from maize, wheat and potato mainly



which are themselves raw materials for animal feeding

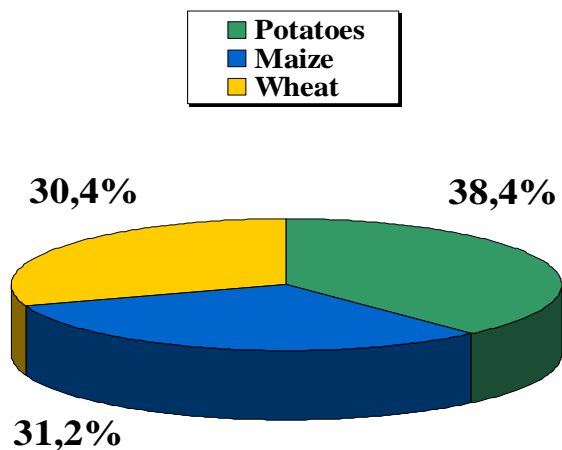




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Raw materials

Used in the EU starch production



Total : 22.6 mio tons

Data 2005

Typical composition

| <u>Source</u> | <u>Starch</u> | <u>Moisture</u> | <u>Protein</u> | <u>Fat</u> | <u>Fibre+ ash</u> |
|---------------|---------------|-----------------|----------------|------------|-----------------------|
| Maize | 62 | 15 | 8.5 | 4 | 10.5 |
| Potato | 19 | 75 | 2 | 0.2 | 3.8 |
| Wheat | 58 | 14 | 10 | 2 | 16 |

Source : Eco-profiles of the systems used to produce starch and related products. Boustead & S G Panvalkar, January 2001.

By-products represent 25 to 50 % of the raw materials

They are commercialised :

1. For food usage.

Examples :

maize oil



wheat gluten



2. Most of them are used for animal feeding, as a source of energy and protein ... to produce food ! (e.g. meat, eggs, milk, etc.):





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Facts and Figures

Every year, the EU starch industry produces **on average** about **5 million tons** of by-products.

These by-products represent a large and diversified range of raw material sources for feed uses. This diversity is related to :

- Physical presentation : dry (pellet or powder), wet, liquid.
- Type of animals : Pig, poultry, cattle, fish, pet animals.
- Geographic distribution: local around the plant, national or international
- Market organisation : compound feed producers, cooperatives or private merchants, brokers, groups of farmers.



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Starch by-products are considered as products, not as waste!

The manufacture of these by-products is a part of our production process in its own rights. These by-products are **manufactured with the same philosophy as for the other products**, i.e. :

- In specific dedicated equipments (dryers, press, silos, loading facilities, ...)
- Undergoing specific analysis programmes to guarantee their composition (within specifications) and quality
- As for other production steps, the production of these co-products is fully documented, with risk assessment
- In all cases, starch companies apply « guarantee feed sanitary safety » (Hygiene through Good Hygiene Practices and HACCP programmes).



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The 4 following examples show the diversity of the starch by-products as raw materials for feed



Maize gluten for compound feed products for laying hens

Corn Feed pellet in «All Mash» feed for beef cattle



Liquid wheat solubles for pigs

Wet potato pulp for dairy cows





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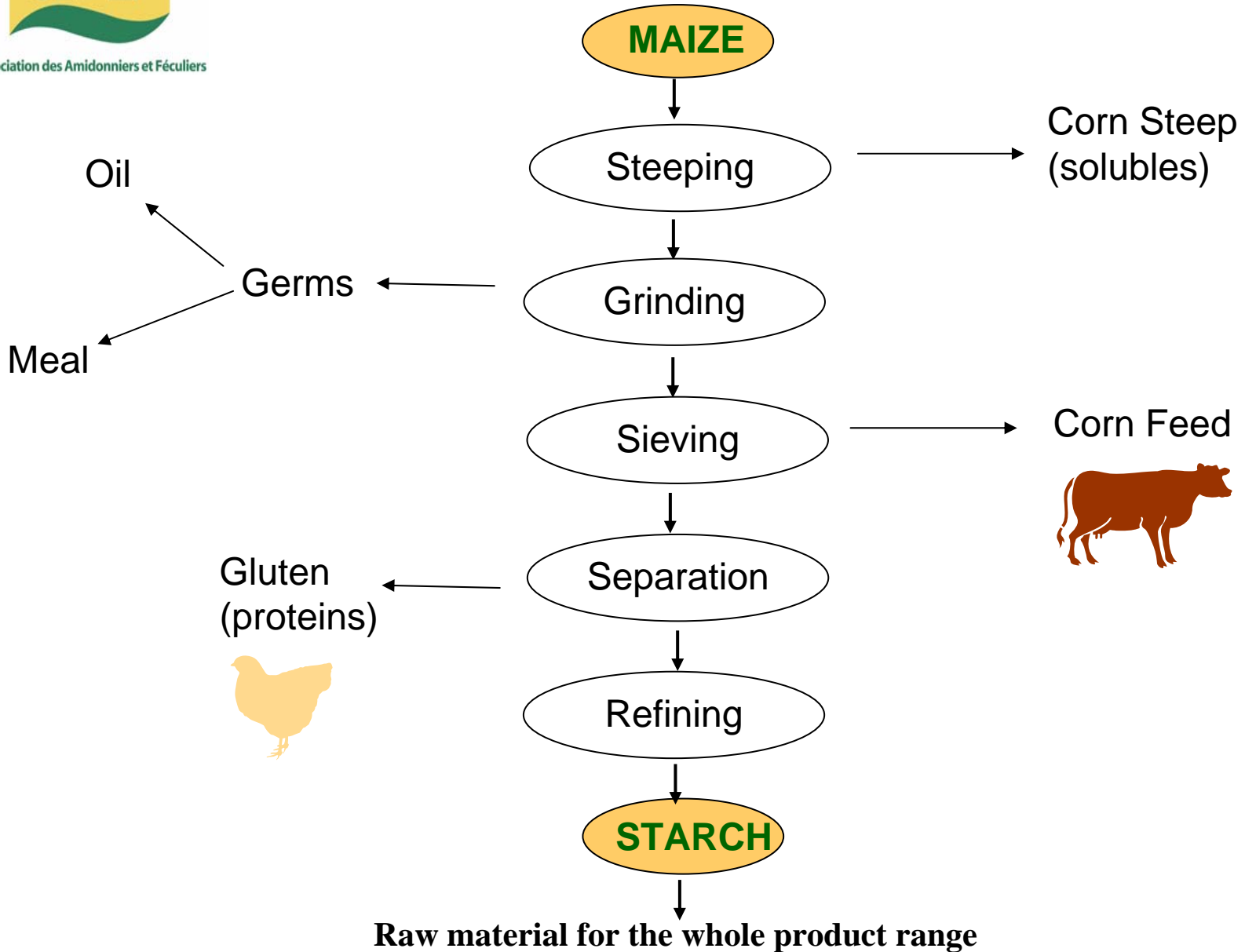
Maize gluten for laying hens





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Maize starch production process





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Maize gluten for laying hens



- Good source of digestible protein for poultry (60 % protein).
- High content of natural pigments (300 ppm xanthophylles) to improve the yellow orange colour of egg yolk, expected by the consumer.
- About 5 % inclusion rate in complete feed for laying hens.
- Very appreciated in specific high-quality productions such as :
« official quality signs », bio/organic production, open-range breeding, etc.
- Direct from the plant, OGM-free (< 0.9 %), natural pigment, with no chemical modification,
- High market value (about 500€/ton).



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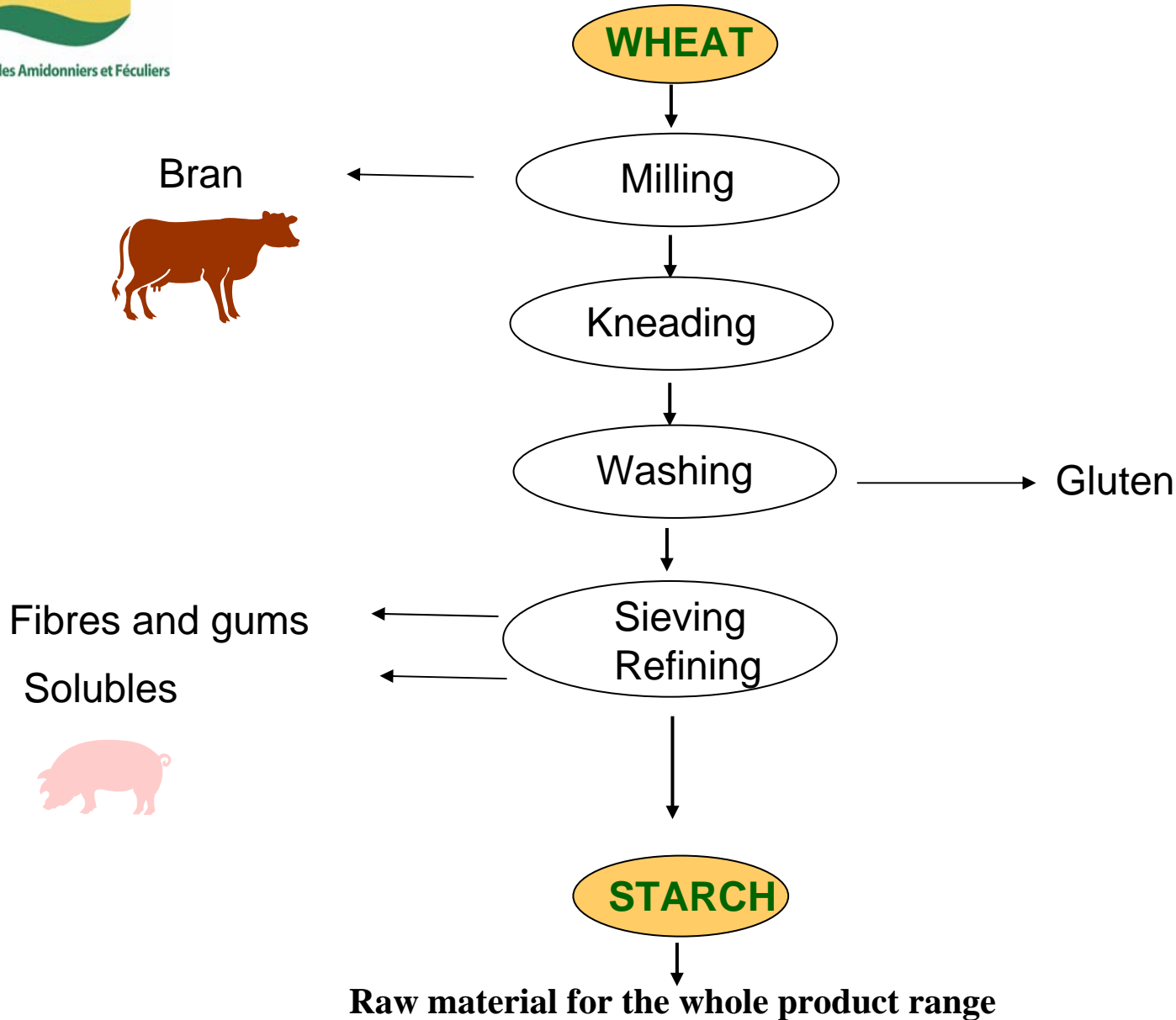
Liquid wheat solubles for pigs





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Wheat starch production process

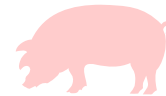




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Liquid wheat solubles for pig feeding



- With the quick growth of the wheat starch industry from 80's, several thousand tons of this co-product appeared on the EU market (UK, Holland, Germany, Belgium, France).
- Liquid product, around 10% to 27 % dry matter, with adapted logistics.
- Pig farmers have adapted their feeding system to be able to use this excellent energy and protein source in a liquid form.
- A common interest was found between industrials and farmers to avoid the high energy cost of drying.



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Legislation and controls

In addition to national legislation, quality controls and company rules, these by-products are subject to the following EU legislation:

Framework:

Council and Parliament Regulation 178/2002/EC = general principles on food and feed law, food and feed safety, traceability and liability

Genetically Modified Food and Feed:

Regulation (EC) No 1829/2003 of the EU parliament and of the council of 22 September 2003 on genetically modified food and feed

Feed materials:

Council directive 96/25/EC of 29 April 1996 on the circulation and use of feed materials

Feed Hygiene:

Regulation (EC) No 1831/2003 of the European parliament and of the Council of 22 October 2003 laying down requirements for feed hygiene

Undesirable substances:

Directive 2002/32/EC the European parliament and of the council of 7 May 2002 on undesirable substances in animal feed

Prohibited components:

Commission decision 2004/217/EC of 1 March 2004 adopting a list of materials whose circulation or use for animal nutrition purposes is prohibited



Matching the four IRWM criteria

| | Suitability as an input | Intention to exploit the product | Subject to legislation in place | Existence of a market |
|---------------------------|------------------------------------|---|--|----------------------------------|
| Maize gluten | ✓ | ✓ | ✓ | ✓ |
| Corn Gluten Feed | ✓ | ✓ | ✓ | ✓ |
| Liquid wheat solubles | ✓ | ✓ | ✓ | ✓ |
| Wet potato starch pulp | ✓ | ✓ | ✓ | ✓ |

Conclusion :
Starch by-products are products and not waste !



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Thank you for your attention !

Any questions ?