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Paper or Plastic – a surprising comparison
A study of available technologies for retail flour packaging

VS.

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Agenda

1. Challenges of Flour Packaging
2. Bag Types – a general comparison
3. Life Cycle Assessment – Ecobalance
4. Cost on Investment and Consumables
5. Result

Challenges of Flour Packaging

Trend:

Selling of foodstuffs in supermarkets instead of village shops.

Reasons:

- Growing population - urbanisation
- Increased buying power
- Demand on high turnover for packed foodstuff

→ Importance of POS is growing.

Demands on Flour Packaging for Retail

- easy to handle
- attractive presentation
- protect the product
- compact, tight, properly closed
- correct in weight
- have no leakage
- symmetrical and consistent in shape
- low steam barrier for longer shelf life

Challenges of Flour Packaging

- "Retail is detail" and to achieve success, your packaged products must present themselves in the right way to the consumer.

Bag Types – A General Comparison

Plastic:

+ tear resisting
+ cheap primary packaging.
+ expensive secondary packaging.

- Flexible, fluffy, bad presentation in the supermarket shelf.
- no direct palletising – demand on strong secondary pack

Bag Types – A General Comparison

Paper:

- Sensitive towards moisture
- Image barrier

+ Self supporting
+ Wide facing for marketing
+ rectangular and consistent shape
+ compact, tight, properly closed
+ Better handling of secondary pack

Life Cycle Assessment

Ecobalance - Expenditure of Energy

Energy per 1.000kg Packaging / Packaging	Plastic	Paper
Manufacturing	21.630,45 MJ	5224,95 MJ
Transport	900,15 MJ	
Recycling	1290,65 MJ	Integrated in the manufacturing process
Total	**23.821.05 MJ**	**6.125.1 MJ**

Life Cycle Assessment

Ecobalance - Carbon Dioxide Emissions

	Paper (4,5t)	Plastic (1t)
Gas CO_2	2754000 g	2320000 g
Halon	227,12 g	401,8 g
Methane	74250 g	48400 g
Nitrous Oxid	9336 g	1809 g
Transport	304000 g	67575 g
Total (in CO_2)	3141813,12g = 3,14t	2438185,8g = 2,44t

Life Cycle Assessment

Ecobalance - Sustainability:

	Paper	Plastic
Raw Material	99,6 %	0,5%
Energy Expenditure (from renewable energy sources)	11,24% = 3098,74MJ (4,5t)	3,2% = 215,15MJ (1t)
Reusability (within the production cycle)	90%	0%

Degradability

Some of the plastic material will be landfilled or burnt instead of recycled. That causes high damage to the environment as only 5% will be degraded after 150 years. Paper, however, will be degraded 100% in short term.

Potential Risk

1 Liter oil can contaminate 1.000.000 Liter drinking water.

Life Cycle Assessment

Ecobalance – Conclusion:

	Paper	Plastic
Expenditure of Energy	+ -	-
Sustainability - Raw Material - Expenditure of Energy - Reusability	 + + +	 - - -
Environmental Pollution - Greenhouse Effect - Emission Damage - Risk Potential - Degradability	 - - + + +	 + + - - -
Total	+ + +	- - - -

Cost

Material Costs:

- Typical LDPE film, appr. 70 µm, 2 colour printing. Size for 1 kg bag: appr. 340 mm web x 220 mm length

  → Approx. USD. 0.59/sqm

- Higher quality film e.g. OPP/PE, same printing, same size

  → Approx. USD. 0.68/sqm

- Paper bag 95 x 65 x 200 mm, 70 g kraft paper, 2 colour printing.

  → Approx. USD. 0.47/sqm

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Cost

Investment for Paper Bag – 220 BPM:

Category	Value
2x Fawema FA 314.3	838,000 €
2x Fawema UP 3	140,000 €
2x Garvens Checkweigher	73,540 €
1x Lorenz Pan Europal 49	109,000 €
1x Liegat stretch wrapper V 300	76,000 €
Transport FCA Northsea port	10,000 €
Installation	70,000 €
Total cost **Total cost per bag:**	**1,336,540 €** **6.075 €**

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Cost

Material cost – Paper bag(1 Mio pcs)

Category	Value
Premade Paper bags	30,080 €
Costs (USD 0.47/sqm)	
Hot glue (2x FA 314.3 1g/10bags)	100 Kg
Costs (3.15€/Kg)	**315 €**
Shrink film (Kg)	3,175 Kg
Costs (1.89€/Kg)	**6,000 €**
Stretch film (200g/pallet)	8,333 Kg
Costs (3 €/Kg)	**25,000 €**
Total costs	**61,395 €**

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Cost

Investment – Plastic – 100 BPM:

Category	Value
2x Fawema VC 250	254,972 €
2x Garvens Checkweigher	73,540 €
1x Case Packer – American Case, with collation	330,000 €
1x Lorenz Pan Europal 49	109,000 €
1x Liegat stretch wrapper V 300	76,000 €
Transport FCA Northsea port	10,000 €
Installation	50,000 €
Total cost **Total cost per bag**	**896,742 €** **8.967 €**

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Cost

Packaging material plastic (1 Mio bags)

Category	Value
LDPE film	44.132 €
Cost (0.59 USD/sqm)	
Box (American Case)	33.333 €
Cost (500 €/1,000 pcs.)	
Stretch film (200g/pallet)	8,333 Kg
Costs (3€/Kg)	**25,000 €**
Total costs	**102,465 €**

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Results

	Plastic	Paper
Appearance	-	+
Ecobalance	-	+
Machine Investment	-	+
Running Cost	-	+
Result	-----	+++++

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Thank you very much for your kind attention and consideration!

Please find more information at:
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