

HQCF versus Maize starch in paperboard production

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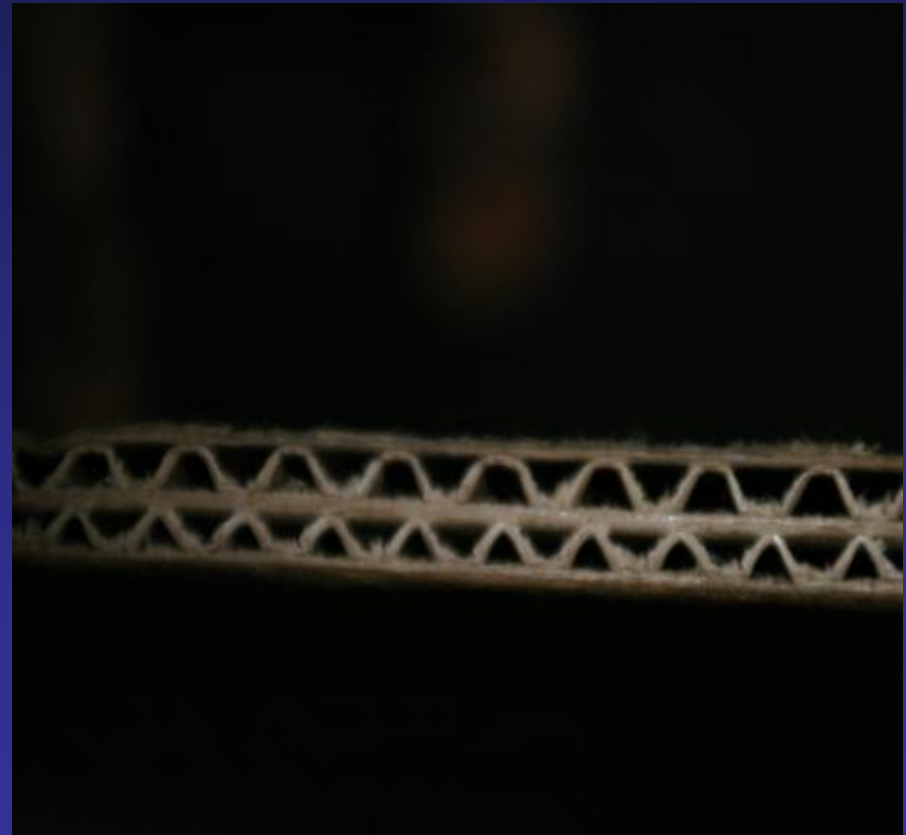


PAPERBOARD



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- Substitute maize starch in paperboard adhesive
- Malawi, ~520 t/yr
- Regional Mkts >1,000 tons / yr
- Maize starch = US\$850-1,200 / t
- HQCF = US\$425-600 /t



PAPERBOARD ADHESIVE

- Water (73%)
- Maize starch (26%)
- Caustic soda (0.6%)
- Borax (0.3%)
- Preservative (0.1%)

- Free flowing
- Pasting temperature
= 60-63°C
- Viscosity 26-30
Steinhall seconds



PAPERBOARD LINE ~35m LONG



GLUE PANS



CAN YOU USE CASSAVA STARCH / HQCF IN PLACE OF MAIZE STARCH?

- Numerous attempts in Malawi using poor quality cassava flours & starches
- No success with cassava flour
- One success with cassava starch



RURAL CASSAVA STARCH

- Capacity 0.3 ton / day
- Rely on sun drying
- Order 20 tons / month
- Rural delivered 12 tons after 8 months!!
- Variable quality
- Sand 4% w/w



REASONS FOR FAILURE?

- Lack of understanding of paperboard adhesive technology
- Poor quality products, high fibre & other contaminants, poor quality starch (damaged granules)
- Poor management (inconsistent quality)
- Inability to supply required volumes using small-scale rural processing operations relying on sun drying

C:AVA APPROACH

- Quality management (including laboratory analysis) to ensure HQCF = high quality starch & low fibre (3%*), no contaminants
- Understanding of formulation process to meet customer requirements

* Ideal for HQCF = 1.4% (for pure starch fibre is typically 0.2%)

FACTORY SPECIFICATION

- Free flowing adhesive – does NOT gel in the glue pans
- Pasting temperature 60-63°C
- Viscosity 18-22 Steinhall seconds (18 would be ideal)
- Mixing time ~51 minutes (maximum)
- Good bonding – no dry joints, no “zipper board”

HQCF TRIALS

Criteria	F1	F2
Water	78%	79.2%
HQCF	21.2%	20%
Caustic soda	0.4%	0.4%
Borax	0.3%	0.3%
Preservative	0.1%	0.1%
Time	52 minutes	35 minutes
Pasting temp	62°C	62°C
Viscosity	22 Seconds	18 Seconds
Bonding	Excellent	Excellent

PROBLEMS ON THE LINE

- Line lacks cooling systems, create gelling problems on glue pans
- Maize starch: 4-5 hours
- Cassava starch: 45 mins
- HQCF: 2 hours 35 mins



SOLUTION

- Replace cooling jackets on glue rollers, mixer bars in pans, install cooling system for glue holding tanks & upgrade steam pressure controls
- NAMPAK paperboard expert estimated US\$15,000 – US\$20,000 to upgrade cooling system

OUTCOMES

- HQCF can be used to replace maize starch in paperboard adhesives
- Lack of cooling would limit replacement to 50% of volume used, with proper cooling = 100% replacement of maize starch
- MD of factory in Malawi is going ahead with upgrading of cooling systems

NEXT STEPS

MALAWI	NIGERIA
Discuss regional markets with NAMPAK in South Africa & NAMPAK factories in Zambia & Zimbabwe	Discuss potential of HQCF with Nigerian paperboard makers
Conduct trials & demonstrations regionally and in Malawi	Conduct trials and demonstrations in Nigeria

QUESTIONS

- Do you have a packaging industry or close to a regional market?
- Could you supply 35-60t HQCF / month reliably?
- Subsidiary questions: What is the market size for maize starch in paperboard?, current price?, do they prepare glue on site or do they use a pre-mixed powder?