

PALM-BASED POLYOLS AND POLYURETHANES

by: **SALMIAH AHMAD; OOI TIAN LYE; NORIN ZAMIAH KASSIM SHAARI and TUAN NOOR MAZNEE TUAN ISMAIL**

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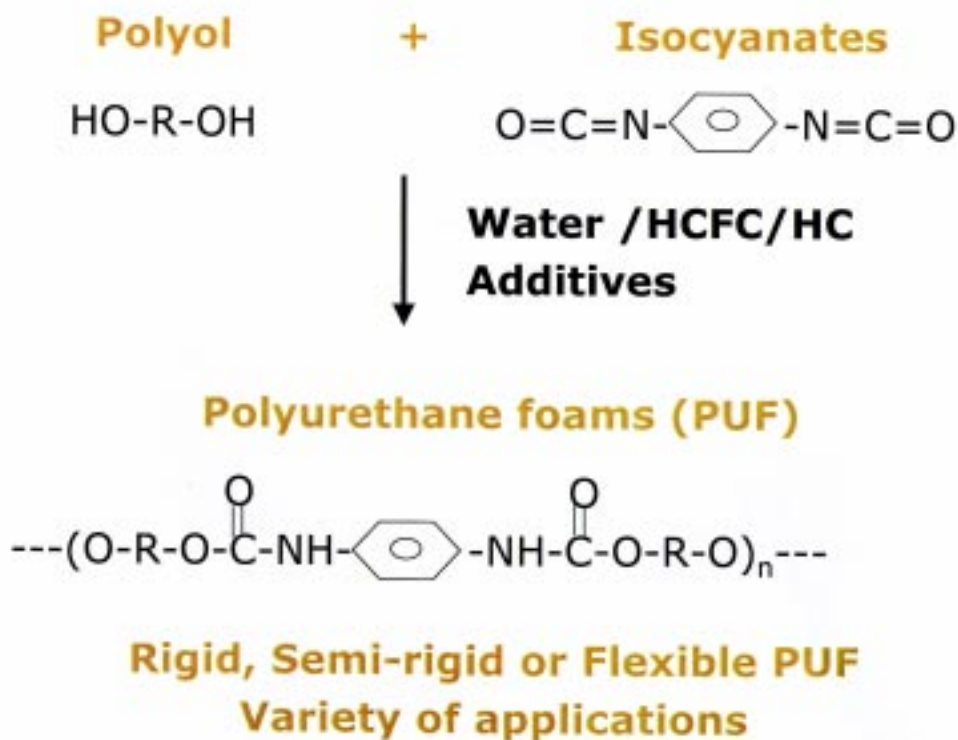
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Polyurethanes (PU) are very versatile polymers used in a variety of applications such as insulators for refrigerators and roof, construction materials such as ceiling and wall panels, furniture, cornices, parts of cars, etc. Polyurethanes are usually formed by reacting polyol with isocyanates.

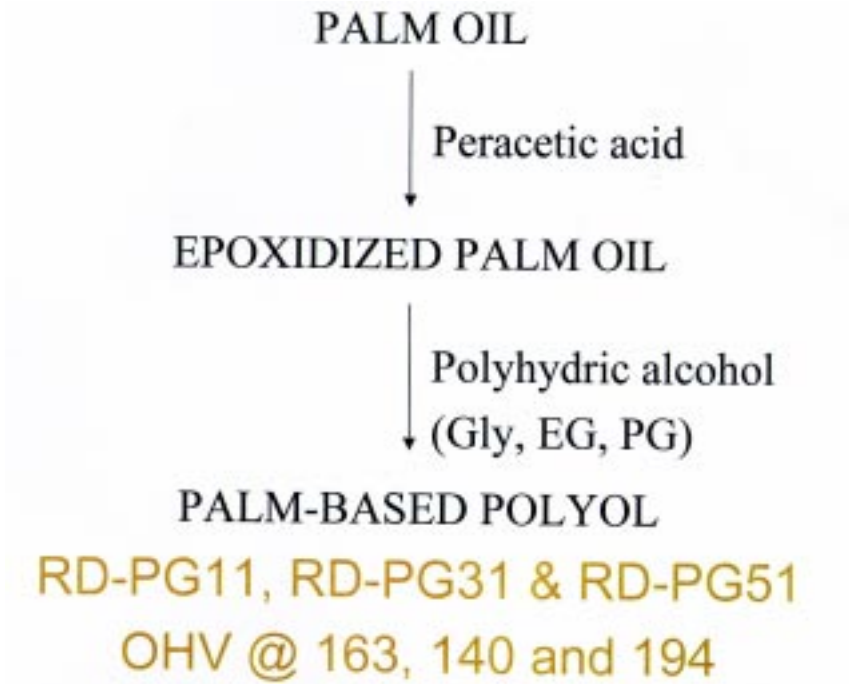
In the year 2000, the world consumed about 8.65 million tonnes of PU comprising 4.64 million tonnes polyols and 3.81 million tonnes isocyanates. In the same year, Malaysia consumed about 29 407 t of polyol and 17 945 t of isocyanates. Assuming 1/1 ratio of polyol to isocyanates, this implies a consumption of at least 35 890 t of PU products. All these raw materials are petrochemical-based.

Due to fast depletion of petroleum, R&D to look into alternative sources for PU raw materials have been on-going. But to date, only the production of polyol based on renewable materials such as oils/fats and starch have been reported. Research into the production of epoxidized palm oil (EPO) was initiated by the Palm Oil Research Institute of Malaysia (PORIM) in the early eighties. From EPO, a process to produce polyol was then developed. InterMed Sdn. Bhd., a local company, was interested in the technology to produce palm-based polyol and in March 1994 an agreement to produce and commercialize epoxidized palm oil, palm-based polyol and their products (in particular PU) was signed. Arising from this collaborative work, a process to produce polyol from palm oil was patented in Malaysia, Singapore and Indonesia.

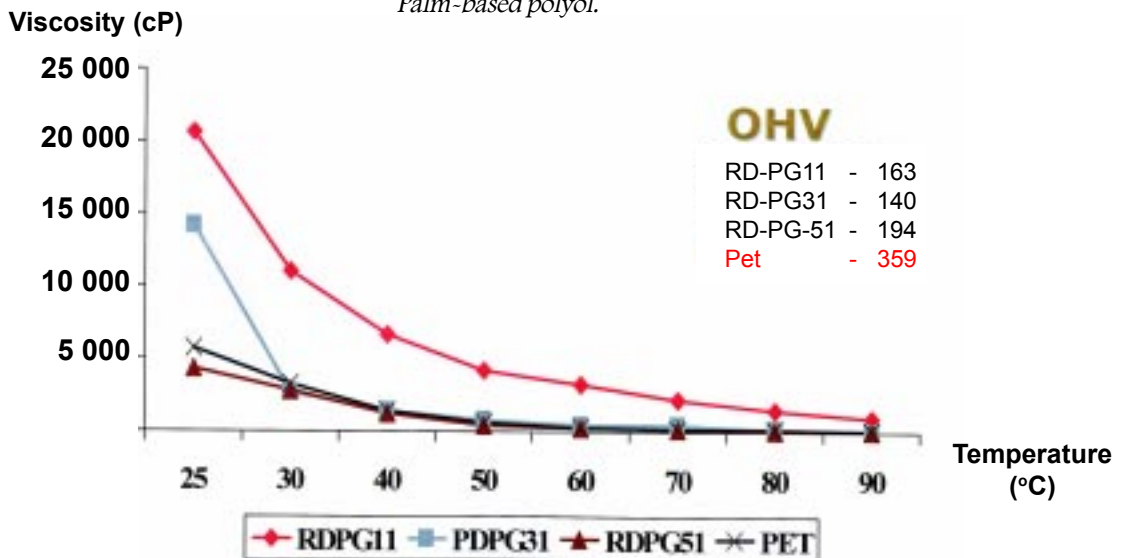


What is polyol?





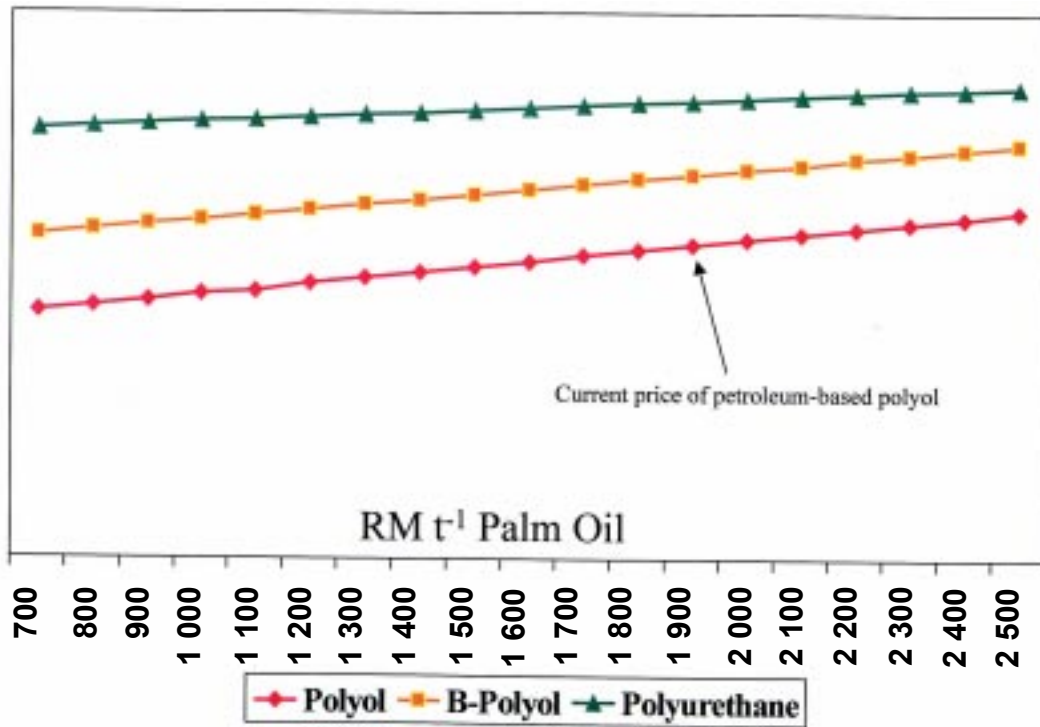
Palm-based polyol.



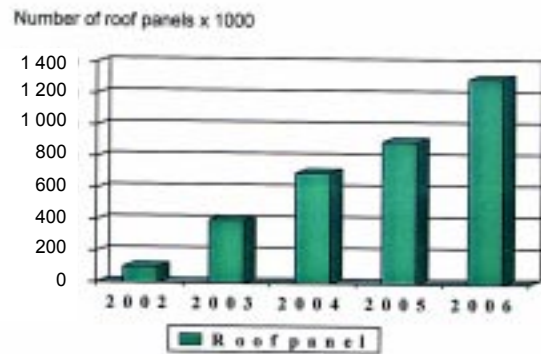
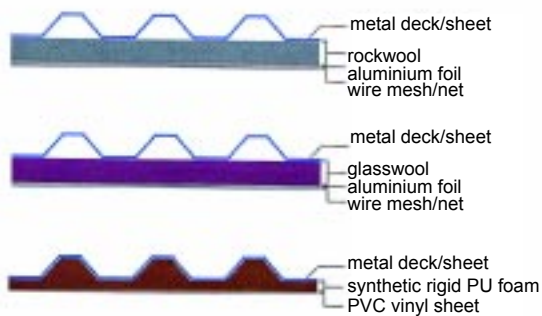
PARAMETERS	RD-PG11	RD-PG31	RD-PG51
Appearance (25°C)	Paste	Liquid	Liquid
Hydroxyl value (mg KOH g ⁻¹)	185-250	110-145	125-185
Melting point (°C)	40	-	-
Storage temperature (°C)	25-30	25-30	25-30
Storage stability (months)	6	6	6
pH (10 g in 60 ml solvent)	4-5	3-4	3-4
Acid value (mg KOH g ⁻¹)	6-7	6-7	7-8
Specific gravity (50°C)	0.94	0.94	0.94

Properties of palm-based polyol.

Price RM kg⁻¹ (not disclosed)



Prices.



Polyurethane products.

In July 2000, an 800 kg batch⁻¹ pilot plant to produce palm-based polyol was commissioned in MPOB.

Palm-based polyols from the MPOB pilot plant were used to produce PU for a variety of applications in order to evaluate their suitability. They were found to be suitable as insulator in refrigerator, roof insulators, wall panels, ceiling panels, cornices, flower foams and lazy foams. Collaborations with potential palm-based polyol end-users were also sought and recently Lafarge, the biggest manufacturer of roof tiles in Malaysia has expressed interest in palm-based PU ceiling panels.

Taking Malaysian new construction projects into consideration, economic feasibility study conducted by InterMed Sdn. Bhd. revealed that, there is a huge market potential for the sale of wall, roof and ceiling panels in Malaysia. If InterMed Sdn. Bhd. were to cater for less than 2% of the total market, about 16 000 t of polyol need to be produced and the investment required is recoverable after six years in operation.

Thus, the potential to use palm-based PU as wall, roof and ceilings panels in new construction projects is huge. The return for investment is also good. The project team (InterMed and MPOB) has decided to work together to find a third partner to finance the project. The project team hopes that the third partner will finance 51% of the project while the other 49% will be shared between InterMed and MPOB. However, the project team hopes to be appointed as management team to ensure that the project takes off successfully.

The offer is still negotiable and proposal for other form of collaborations are also welcomed. Interested parties may contact the following personnel in MPOB for further discussions:

1. Datuk Dr. Yusof Basiron (yusof@mpob.gov.my),
Tel: 03 - 8925 9522
2. Dr. Ma Ah Ngan (man@mpob.gov.my),
Tel: 03 - 8925 9592
3. Dr. Salmiah Ahmad (salmiah@mpob.gov.my),
Tel: 03 - 8925 6055

The project team is of the opinion that if commercialized, the following advantages can be expected:

1. Diversifying the end-uses of palm oil into a new area of application where the potential value to be gained is higher than its current value when sold as frying oil.
2. Commercial exploitation of indigenous technology. This technology is unique to palm oil and was developed by Malaysian researchers.
3. Since all materials required for PU manufacture is imported, if commercialized this will reduce some of the imports.
4. The products to be produced using palm-based polyols are more environmentally friendly than the current materials used in the industry.
5. The market for PU is big, both for local consumptions as well as for exports.

AWARDS

This technology bagged a Silver Award in I'TEX 1999, PORIM Director-General's Award for Excellence in Science in 1999 and CRDF from MTDC (to InterMed Sdn. Bhd.) of RM 1.07 million.

For more information kindly contact:

Director-General
MPOB
P. O. Box 10620
50720 Kuala Lumpur, Malaysia.
Tel: 03-89259155, 89259775,
Homepage: <http://mpob.gov.my>
Telefax: 03-89259446