

## **LOW NITROGEN NATURAL RUBBER**

*By*

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Successful production trials have been carried out by the RRI to prepare Low Nitrogen Natural Rubber (LNNR) also referred to as Deproteinised Natural Rubber (DPNR), using locally available proteolytic enzyme, papain.

Natural Rubber (NR) being a naturally occurring substance is accompanied by other naturally occurring substances such as proteins and Carbohydrates. These non rubber, high molecular weight materials increase internal friction resulting in heat build up of vulcanized rubber on flexing. NR outperforms most synthetic rubbers in generating less heat and is the preferred polymer for heavy duty tyres. LNNR would be a super grade of NR ideally suited to increase the performance of heavy duty tyres. Low moisture absorption due to the fact that it is a deproteinised version of NR makes it a likely candidate for applications where low moisture absorption is important. Due to the same virtue LNNR is also more resistant to mould growth. A recent study conducted by the Overseas Development Administration (ODA) in U.K. has shown limited applications for LNNR in

- (a) Certain types of engine mountings for vehicles.
- (b) Various types of bridge mounts for use in adverse environments such as salt water.
- (c) Some off shore oil applications.
- (d) Surface coating of wire used in the construction of tyres to reduce the risk of corrosion.
- (e) Rubber to metal bonding in order to get a perfect and lasting bond.

It is estimated that the market for LNNR could in the long term, develop into a world demand of the order of 5000 tonnes. If this were to be the case the market would have two major characteristics.

- (a) A major segment of the market, the automotive industry would require large quantities of absolutely consistent material and would be unlikely to bear a high price premium over conventional rubber.
- (b) The other users could absorb the high prices involved but they would be fragmented and in many cases would require extensive contacts between the users and the suppliers.

A specialist West Gorman Trader is developing a structured approach to the market, and his efforts have paid some dividends.

Since the development of LNNR has reached the commercial implementation stage the future role of the RRI will be to act as a contract research centre supporting the manufacturing organisation in further development work and its relationships with its agents.

Potential Net Benefit of LNNR business is calculated on the basis of a model illustrated in Table 1. which is approximate. To work out the model the following assumptions are made.

**Table 1**

**POTENTIAL NET BENEFIT OF LNNR BUSINESS**  
(Profit on LNNR less Profit on RSS)

**Assumptions**

1989 Sales	.....	.....	50 tonnes (t)
Growth of Sales	.....	.....	10,20 and 50%/ annum.
Price Premium on RSS	.....	.....	5,10,20 and 50%
RSS price	.....	.....	20,000 Rs/t.
LNNR production costs	.....	.....	22,450 Rs/t.
RSS production costs	.....	.....	18,930 Rs/t.

**NET CUMULATIVE BENEFIT AFTER 10 YEARS—Rs. 000'**

Growth %/Annum	Tonnes In 1998	Price Premium on RSS			
		5	10	20	50
10	130	-2,335	-1,408	445	6,004
20	310	-4,051	-2,443	772	10,417
50	2883	-21,545	-12,996	4,104	55,402-