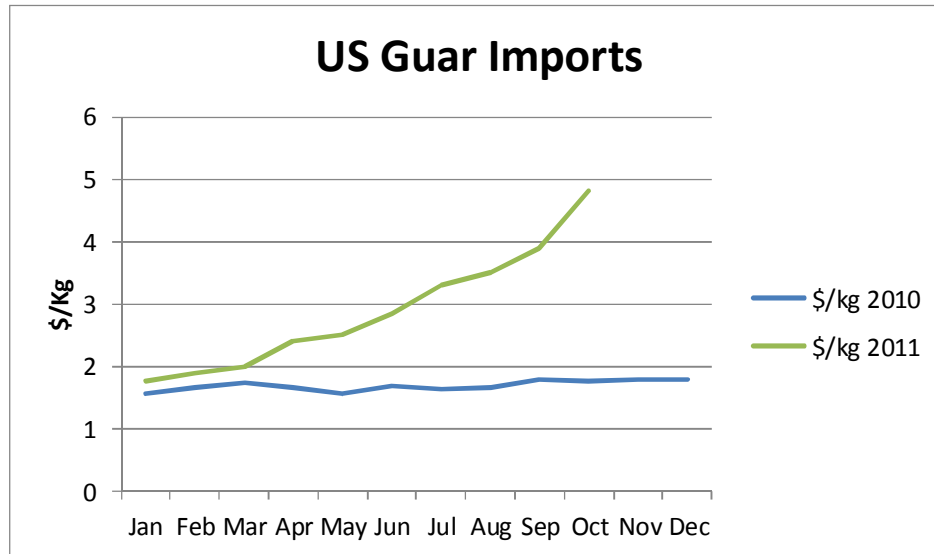


Notes on Guar supply situation based on IMR report Qtr 4 2011

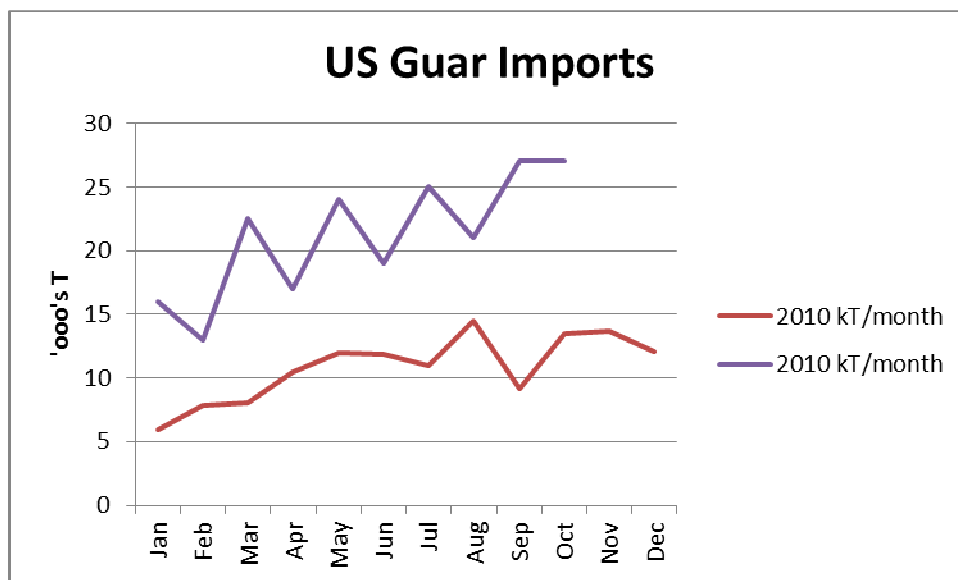
1) US Import Prices and Volumes 2010-Oct 2011

As the US and Canada represents 63% of Global demand (306kT) where oil fracking is a key use, it is worth noting reported prices and volumes as published by US authorities.



Prices were relatively stable until Mar/Apr 2011 when demand started to outstrip supply. Current prices, not confirmed by US Imports, are approx. \$11/kg!! Double that of Oct prices.

In volume terms over this period guar imports grew from a 3month moving average of 7kt per month at the beginning of 2010 to 25kt per month by Oct 2011.

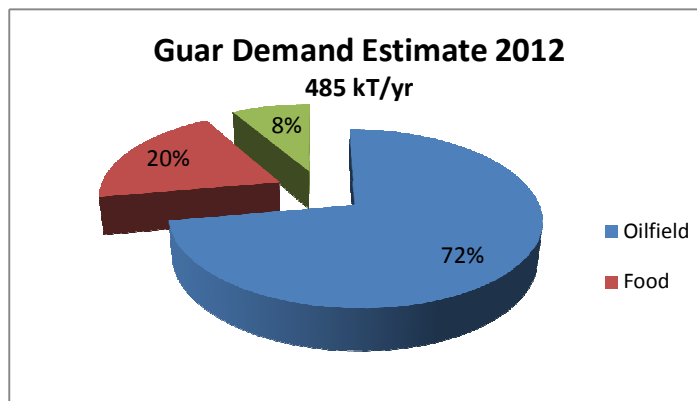


2) Total supply and demand estimate

Current estimates of key producers is as follows

Suppliers	Capacity	Expansion	2013
	T/Yr		Total
Hindustan	45	21	66
Rajastan	30	45	75
Lucid	37.5	15	52.5
Vikas	30	12	42
Shree Ram/Caremoli	24	12	36
Sunita	19.5	6	25.5
Satyam	12	12	24
Shree Ram Chem	12		12
Shrinath	12		12
Others	203	60	263
Total	425	183	608

In total it has been reported that during 2010-2011 the key bottleneck in the guar supply chain. India guar producers represent 84% of guar supply with Pakistan at 13%. Total reported capacity was at 425kt per year with estimated sales of 385kt per year with a demand growing to be nearly 500kT in 2012.



At present there appears to be no let up in demand from the oil industry. Alternative polymers are being sought BUT there seems to be no other polymer that perform as required in the oil fracking application . Even if one were found there is not known of any polymer with such volumes available. This is also true for food except for CMC and Xanthan. Even if other galactomannans, tara , Lbg and cassia, could be made to work, their availability is at significantly lower, not to mention that cassia is not yet approved in many countries, eg USA.

3) 2012 outlook

Since last October and starting 2012 prices have continued to rise at an extraordinary rate. CyberColloids has been involved with sourcing guar **splits** with prices at the end of December for immediate shipment were around \$4.5/kg FOB. As of the 24th January this price is now up 87% to almost \$8.5/kg for shipment in March.

With this type of price increases there is now a severe risk for food customers who have placed contracts at lower prices will not be met as their 'allocation' will to be 'switched' to the more lucrative oil customer.

Evidently some user companies have requested an investigation into be made but to whom and by whom??

There is one glimmer of hope. Normally guar is only planted once a year mostly in the non irrigated areas of India, around Rajasthan with a smaller crop in the irrigated areas of Haryana. There are now reports of a second crop in Haryana being planned which could yield an extra 50-75kT coming on stream mid year with new capacity in place. What that will do to price is anyones guess.

IMR also reports that by 2016 demand from the oil industry will be around 617kT per year up, 117% from that which was supplied in 2011. This demand would also be slightly over 100% of planned new capacity resulting in the possibility of food and other non oil customers being squeezed out altogether.

Can more be grown? Will producers continue to invest in new capacity?

Will substitutes be found? Evidently there is another unexploited galactomannan, Sesbania Gum, which has come to CyberColloids notice. In a recent paper by Pollard, Carbohydrate Polymers 84 (2011) 550–559, reports that the Sesbania polysaccharide has a *molecular composition and chain-length distribution were found to be nearly identical, and thus galactomannans within this genus are presumed to share a common molecular structure ($DS_{gal} \approx 0.7$, $M_w \approx 2.5 \times 10^6$, $PDI \approx 2$). Solutions at $c > c^*$ exhibited shear-thinning behavior*.

What is unknown is how such a gum would perform in non food applications, as we don't believe that it could be sold as guar, as well as whether a suitable supply chain could be set up to produce a powder. All very interesting but any advances will only come into being in the medium term.

All in all there is no doubt that prices will be remaining high for some time yet.

The only comfort is that all food companies are faced with the same problem.

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