

CASE STUDY INTERIM REPORT

Company Name: Rodenburg Biopolymers B.V

Company Address: Denariusstraat 19; 4903 RC; Oosterhout; Netherlands

Website: www.biopolymers.nl

Title: Solyanyl -mouldable bioplastic pellets

Crop: Potato (*solanum tuberosum*)

Family Group: Starch

Stage: Early commercial

Date of Visit: 22 January 2002

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SUMMARY

Rodenburg Biopolymers B.V. is a family owned company situated at Oosterhout. It is a member of the Rodenburg Group founded in 1946. Their core business centres on potato production and processing for the fast-food and frozen-food markets.

The biopolymers company was set-up in 1997 to more-profitably utilise potato by-products by converting them into biopolymers. Remy Jongboom has been with the Project from the beginning and is now joined by Ellen van Gaalen. The product has been given the brand-name Solanyl.

The form of their biopolymer is that of extruded granules, so another stage in the supply-chain is still needed - that of reheating and moulding, to achieve a final recognisable product. On their Oosterhout site, near Breda they have constructed a 7,000 tonne per annum pilot plant, shortly a new 40,000 tonne plant will be brought on-stream. With 3Mt of potatoes grown each year in Netherlands there is unlikely to be a shortage of raw material as potato-processing creates 50% by-product.

Unlike many other examples of materials from RRM's which aim only to capture a niche market, usually also charging a premium price on the basis of environmental benefits, Rodenburg are confident that they can take-on the major conventional plastics manufacturers on both performance and price.

They have the ambition therefore to become a global player in the market for bioplastics, tackling bulk markets head-on. They are also keen to point out that they do not seek to imitate conventional plastics in design and performance. Rather they are trying to develop new processes and applications which better suit the characteristics of Solyanyl for example by including fertiliser in solyanyl-based plant pots.

BACKGROUND TO THE COMPANY

Rodenburg Biopolymers is a member of the Rodenburg Group. The upgrading of by-products from the potato industry towards higher added-value products has become a core business to the parent Group over the last 50 years. Rodenburg distributes around 400,000 tonnes of potato by-products each year, to Dutch farmers. This is used as an ingredient in animal feed in a variety of forms. The parent company is therefore experienced in moving and processing large quantities of bulk agricultural materials.

The Solyanyl project began in 1997 with two years of private research funded by Rodenburg Group at ATO in Wageningen. The company management saw the forthcoming problem of unbalanced supply and demand for the by-products that are a consequence of potato processing.

Rodenburg Biopolymers was formed in 2001 and Dutch Government financial support to date has only been in the form of NOVEM and LASER schemes, quite recently. Novem is a Dutch Government subsidy for R&D work. The Dutch Government also gives tax-breaks to companies employing R&D personnel.

SUPPLY CHAIN

Potatoes are grown by Dutch farmers, under contract to Rodenburg Group. The Netherlands grew 3,000,000 tonnes of raw potatoes during 2001 creating up to 50% by-product (by weight) for that proportion which was processed. Of the total amount generated by Rodenburg Group, Biopolymers took only 33%.

The supply of raw material for RB therefore is very large and unlikely to become a constraint in the short or even medium term. Potato peelings are conventionally used as an ingredient in animal feed for intensive livestock systems - mostly cattle and pigs. Recent reductions in animal numbers have created a surplus.

Having the raw material come from part of the same company also means quality control on the incoming material is good. For example, RB can be confident that all their raw material is GMO free as it can receive assurance and make checks within the company as opposed to taking an external supplier's assurance.

This internal company symbiotic arrangement is very interesting as it allows both sides (food processing and biopolymers) to be more economic together than they would be apart. However, each still relies on the other for stability or meeting increasing targets for production. This means that fluctuations in either the processed food or biopolymers markets could damage the profitability or plans of the other.

Their production process is protected through patents and requires few external inputs apart from energy. It is a four stage process :

- Storage in silos to stabilise and ferment
- Drying by fluidised bed
- Extrusion through co-rotating twin-screws
- Conditioning including final drying, and sieving of the extruded granules

MARKET & MARKETING ISSUES

Solyanyl will be the first biodegradable polymer to compete on a price basis with conventional mineral-oil based plastics. Initially it will be sold at around £ 1:00/ kg, about the same price as polystyrene.

Rodenburg have taken a novel and flexible strategy to their marketing. Instead of defining a single product and manufacturing and marketing that; they have opted to produce only an intermediate form as a commodity (pellets) and market these to a wide variety of converting industries. Their approach to potential customers is therefore to ask what function they would like the solyanyl to perform, and then develop a composition to meet that specification. This means a constant program of R&D, but also reduces the risk of being tied to investment in a single product.

Theoretically, the market will grow organically after one or two initial successes. Each will develop their own specification, in conjunction with Rodenburg. This 'partner' approach has much to commend it in today's fast moving markets.

Amongst the specific uses are; incorporating a controlled release substance, such as a fertiliser, or anti-bacterial agent; temporary electronics packaging; as a co-component in paper packaging to keep the packaging 100% biodegradable ; temporary protection plugs for engines in the automotive industry.

FUTURE DEVELOPMENT

This case is clearly at an early commercialisation stage as they are just starting to sell the starch-granules made in their R&D facilities to injection-moulding companies. They predict a large increase in the availability of their product as soon as their new plant comes on stream. This should also reduce the price level of bioplastics which is seen as a barrier to wider uptake.

This case is interesting partly because although it would not involve any immediate increase in acreage of the relevant crop, potatoes, it would make the process chain of the current potato industry, from field to frying-pan, more economic and more environmental-friendly by reducing uneconomic by-products and therefore overall cost

The company expect to build further factories to cope with demand, first of all in France, then North America and finally the Far East. Certainly the growing of potatoes for 'fast-food' outlets is rapidly becoming a global practice, and the by-product situation with washings and peeling is a universal consequence. In some countries however this is not a problem as there are sufficient intensive animal enterprises around to utilise the material. So although the technology is global, the economics of production will vary greatly in different regions.

STRENGTHS

- Short supply chain for raw material, under the control of same Group Company
- Low cost raw material as it is a by-product from an existing stable industry
- Parent company is familiar with the processing technology making it more comfortable with any risk-investment to expand
- Raw material is plentiful for and with good quality assurance for foreseeable future requirements
- Solyanyl can (it is claimed) compete in mainstream market on price - therefore not just confined to niches like most bio-products
- Wide range of technical and market applications possible - extends the risks of dependency on one sector for income

WEAKNESSES

- Wholly reliant on one source and one industry for supply
- True environmental benefits of biopolymers still under discussion
- Highly competitive market - competing against large multi-national players with mature product-ranges

- Must overcome the image problem of Solyanl being a weak, cheap, low specification product - just because it is made from potato 'waste'

OPPORTUNITIES

- Technology is protected so license income is potential future asset
- Huge market scale potential across broad spectrum of industries
- Entirely new products are now possible with biopolymers that cannot be made with mineral-oil based plastics - extending the market, not just substituting.

THREATS

- Changes in EU regulations (food or agriculture) could upset economics
- Competitors are also working on novel technologies on potato starch, e.g BASF with their Ecoflex
- Cheaper sources of starch may become available such as maize or wheat