The Sunlustre Story

A-One Feed Supplements LTD, Over 30 years of Nutritional Expertise and Excellence

A-One Feed Supplements Ltd was one of the first companies in the UK to recognise the full potential of the raw material soya. It represents around 50% of the world oilseed crop and is one of the most widely used protein sources in monogastric animals, and if combined with the latest technologies this protein source could become even more valuable.

Although **Sunlustre** is a totally natural product, considerable research has gone into establishing the technology needed to produce this high quality specialist raw material. The conversion of raw soya beans into high energy and highly digestible feed requires a carefully controlled process involving the correct level of steam, temperature, dwell time and physical shear to produce this product.

The stringent control parameters employed in the manufacture of **Sunlustre** have been developed over a number of years. This development was in conjunction with various institutes to guarantee the potential of the raw soya beans was maximised and make **Sunlustre** the standard inclusion in today's high performance diets.

Wet extrusion has been proven to increase the nutritive value of feedstuffs in several important ways:

- The controlled use of steam significantly reduces the levels of anti-nutritional factors (ANF) in soya beans; which are known to hamper protein digestion through either binding to the intestinal mucosal membrane and degenerating it, altering intestinal permeability and impairing nutrient absorption or competing with protease enzymes preventing the break down of proteins.
- Maximising nutrient availability. This occurs by breaking down plant cell material and making them more accessible for digestion.
- Better amino acid availability, through the use of steam.

With this knowledge, in the 1970's we installed our first wet extruder and have continued to work with superior wet extruders ever since.

Sunlustre is manufactured from only high grade U.S. No 2 soya beans. In the first stage steam is employed in the destruction of the ANF's, whilst at the same time protecting the protein from the damage associated with dry heating. Excessive dry heating is understood to damage the protein leading the lower protein quality. This is followed by the extrusion stage, which maximises oil availability. This method of extrusion also greatly reduces the allergenic response seen in the animal when fed **Sunlustre**.

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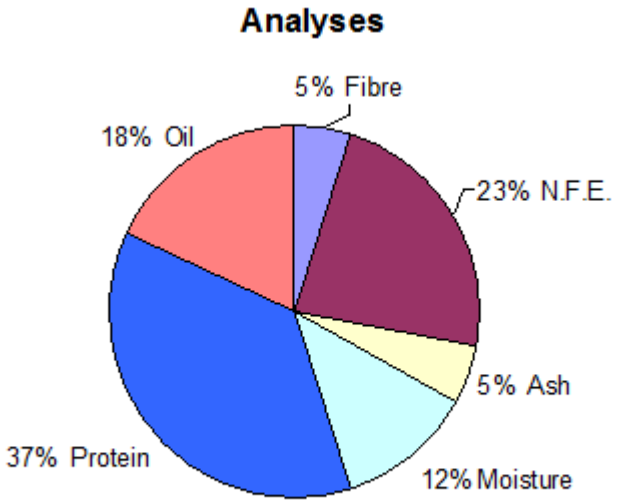
Energy Evaluation

There is much debate around the Metabolisable Energy (ME) value that can be drawn from the various production methods of full fat soya. This energy level is related to the amount of free oil, which in turn is dictated by the degree of cellular rupture. Processing must be a fine balance between maximising the available ME through oil availability, adequate anti-nutritional factor destruction and minimising protein damage.

To help determine the optimal processing for Sunlustre a series of trials were commissioned at Nottingham University to evaluate the ME of **Sunlustre** (see Graph 1 and Table 1). The results concluded that:
Average ME: 17.2 (DM)
Dry Matter: 8%
Tiu Destruction: 90%
Sunlustre was further evaluated at the Roslin Poultry Research Centre in Edinburgh. Here cockerels were used to establish the total ME.
Total ME (ME/kg): 15.0 (AR)
Total ME / GE: 70%

ME MJ/kg (cattle) 15.7
ME MJ/kg (poltry) 15.5
ME MJ/kg (pigs) 18.6



Graph 1. Analysis of Full Fat Soya

Components of Soya Beans	Percentage
Lysine	2.5
Average Lysine	2.3
Methionine	0.58
Threonine	1.4
Calcium	0.24
Phosphorus	0.67
Average Phosphorus	0.32
Palmitic	2.0
Steanic	0.7
Oleic	4.5
Linoleic	10
Linolenic	1.1

Table 1. Percentages of components of soya beans

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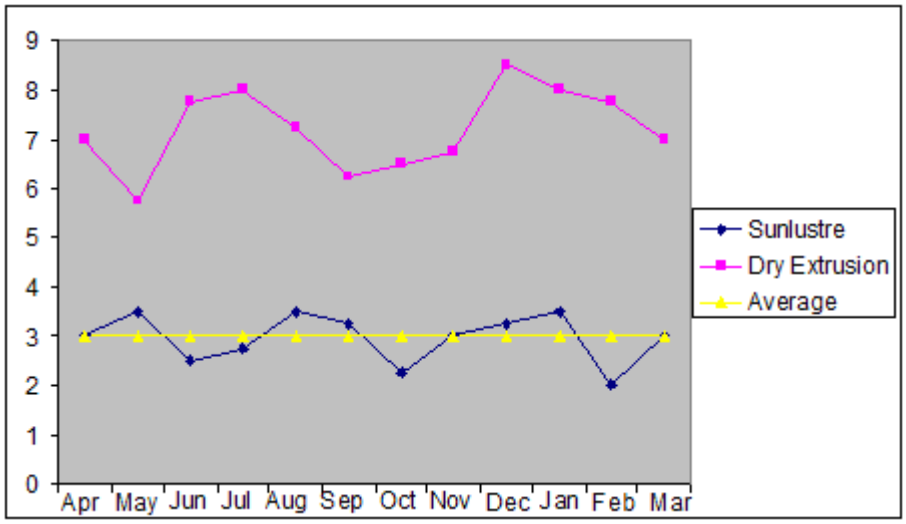
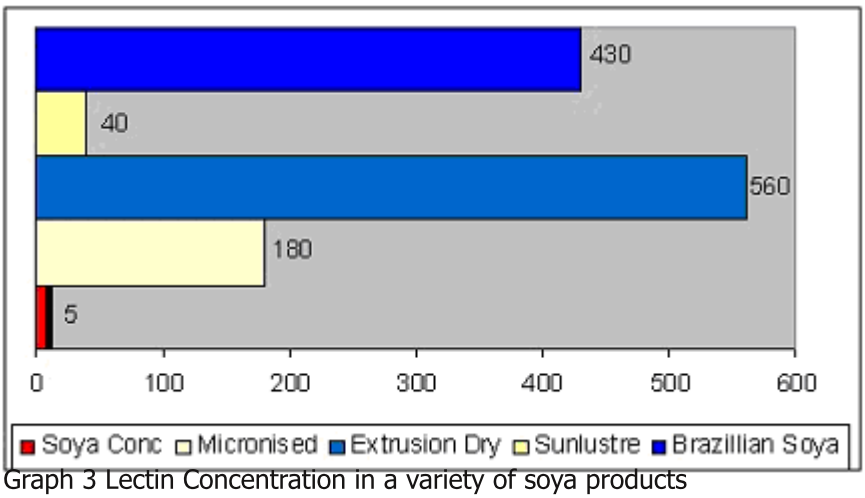
Overcoming Nutritional Problems with Soya

Anti-Nutrtitional Factors of Soya Beans
It is widely acknowledged that oilseeds contain a variety of anti-nutritional factors. In soya beans the major factors are **protease inhibitors** and **lectins**. Both of these are heat liable, however there is a fine balance between inadequate heat treatment leading to inferior protein digestion and excessive heat treatment lowering protein quality. With this in mind, the parameters for processing the soya beans need to be carefully controlled and monitored.

Protease Inhibitors
Protease Inhibitors lead to the prevention of digestion of protein by the competitive blocking of the protein digestive enyzme, in this case, trypsin. Thus preventing it from breaking down proteins in the digestive tract. Graph 2 demonstrates the differences between trypsin inhibitor levels between **Sunlustre** and a dry extruded full fat soya product.



Graph 2. April 1990- April 1991. Trypsin inhibitor levels



Graph 3 Lectin Concentration in a variety of soya products

Lectins
Lectins are found in significant levels in soya beans. The have the ability to bind to the inttestinal mucosal surface, giving rise to degenration of the intestinal membrane, altering intestinal permeability and impairing nutrient absorption. These lectins may also compete for binding sites with the gut bacteria leading to an imbalance in the gut microflora and allowing the colonisation of harmful bacteria rather than beneficial lactobacilli. Graph 3 is the result of work by Bristol University in the development of an ELISA method for the detection of lectins, it shows the differing efficiency of various production methods in eliminating lectins.

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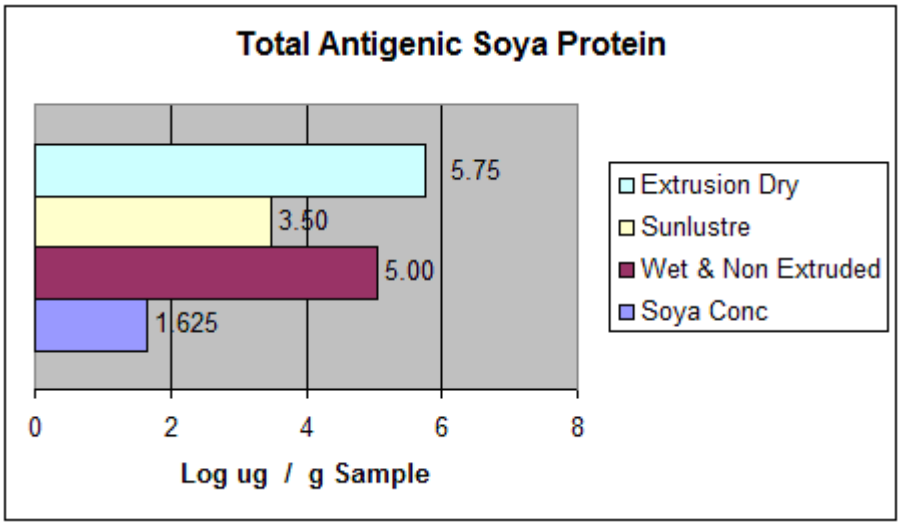
Overcoming Allergenic Problems with Soya

Total Antigenic Soya Protein
Although trypsin inhibitors and lectins are known to be harmful components of soya and do have a deletrious effect on animal performance their presence cannot fully explain the symptoms of poor growth, inappetance, diarrhoea and high mortality often observed when soya is fed to young livestock. Therefore, other compenents must be involved and it has been established that soya contains a group of soluble proteins that possess antigenic properties.

According to J Sissons ' A feed antigen is defined as a macromolecule of dietary origin that is recognised by the immune system of the alimentary tract as foreign, and stimulates the immune system to produce antibodies for eliminating the antigen.' This stimulation is a perfectly normal and desirable response, however, it seems that the soluble proteins can stimulate too strong a response. This can lead to hypersensitivity to soya in livestock, predisposing them to the detrimental symptoms.



Graph 4. Antigenic levels in soya when processed in different methods

To quantify these levels of soluble proteins TNO Wageningen was commissions to evaluate a group of soya products by ELISA for total antigenic soya protein. As you can see from Graph 4 it is the soya protein concentrate, with is alcoholic extraction steps that gave the lowest allergenic response, this was expected. However, it is interesting to note, when comparing the other three methods for extrusion that do not utilise alcoholic extraction that **Sunlustre** has considerably lower allergenic responses than the other two forms. Thus further demonstrating how the manufacturing of **A-One Feed Supplements Sunlustre** substantially reduced the antigenic factors in the full fat soya when compared to other extraction methods. Reducing these allergenic responses will therefore improve the performance of diets for young livestock

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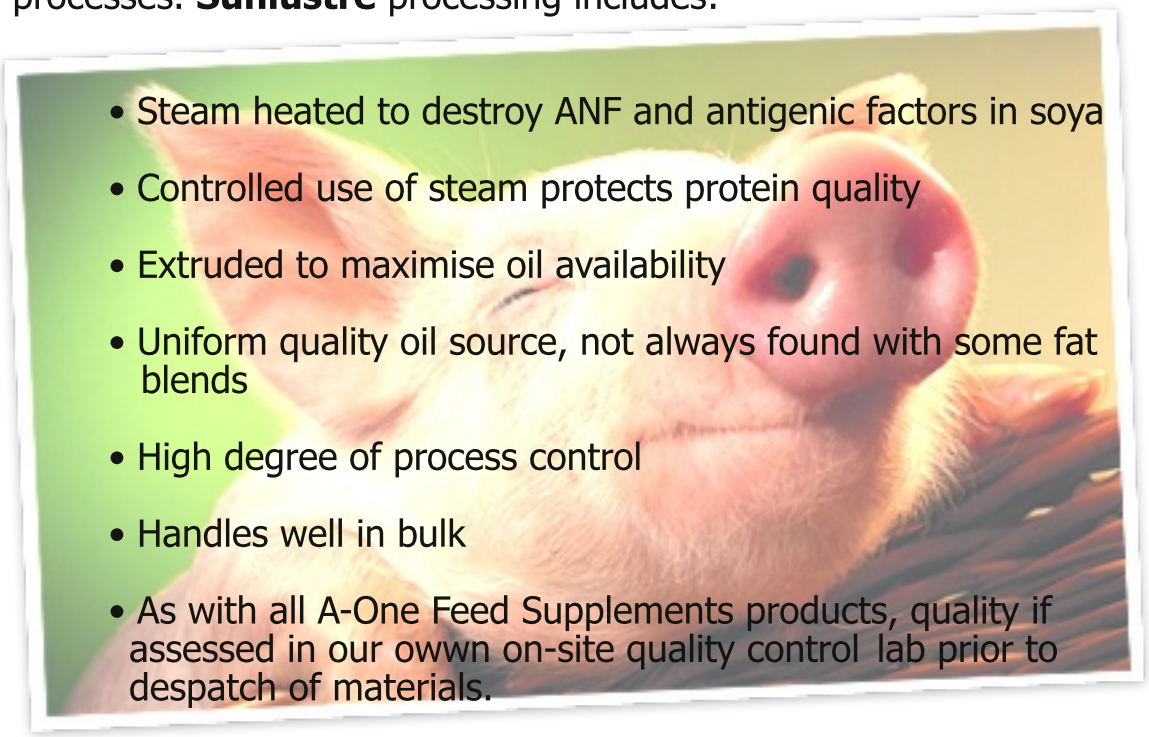
Summary

The processing criteria employed in the manufacture of **Sunlustre** leads to a substantial reduction in the ANF and antigenic properties of soya, especially when compared to other full fat production processes. **Sunlustre** processing includes:



- Steam heated to destroy ANF and antigenic factors in soya
- Controlled use of steam protects protein quality
- Extruded to maximise oil availability
- Uniform quality oil source, not always found with some fat blends
- High degree of process control
- Handles well in bulk
- As with all A-One Feed Supplements products, quality if assessed in our owwn on-site quality control lab prior to despatch of materials.

The use of Sunlustre full fat soya in your livestock diets as the protein source could greatly improve the performance of your herd. For more details please contact our office on 01423 322706 or www.a-one.co.uk