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Soybean Meal Quality by Origin:

Economical Value of Hipro Soybean Meal in Least Cost Formulations

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Schothorst Feed Research

Report: USSEC No. 1

**Least Cost Formulations of Animal Feeds in Different Regions for the
U.S. Soybean Export Council, American Soybean Association-
International Marketing, and United Soybean Board**

Periods: February-April and May-July 2014

By J. Doppenberg, Ph.D.

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0. Executive summary

The added value of higher quality soybean meal in feeds for different species is studied in this report with feedstuffs and prices for four regions: the Netherlands (indicative for North Western Europe), Spain (indicative for South Western Europe), Poland (indicative for North Eastern Europe) and Romania (indicative for South Eastern Europe).

The current market price of Hipro soybean meal in €/100 kg in the different regions is as follows:

Table A. Market prices of soybean meal in different regions

Hipro SBM*	Netherlands	Spain	Poland	Romania**
€/100 kg	42.40	44.90	43.60	45.35

*Hipro soybean meal is sold on a per unit of protein basis, the average protein content of the generic product used in the formulations is 46.8%. **Currently only Lopro quality available, 45.2% crude protein.

The shadow price and the added value of high quality soybean meal depends on the costs of all protein rich feedstuffs offered on the market, the costs of energy rich feedstuffs (grains and fats & oils), the species for which a feed is formulated and the animal category. The inclusion rate of Hipro soybean meal is highest in poultry feeds (10-30%). A higher quality soybean meal is defined as a product with a higher amino acid content per unit of protein (specifically lysine) and a higher organic matter and protein (amino acid) digestibility, resulting in higher digestible amino acid and energy matrix value. Hipro soybean meal is defined as containing on average 46-47% crude protein. The calculated value differences for Hipro soybean meal by origin are:

Table B. Value differences (+/-) of Hipro SBM in €/100 kg among origins, due to different nutrient values (see Appendix for matrix values), for feeds for different species (based on a Hipro SBM price of € 42.40/100 kg in the Netherlands for week 5)

	Swine			Layer			Broiler		
	Argent. vs Brazil	U.S. vs Brazil	U.S. vs Arg.	Argent. vs Brazil	U.S. vs Brazil	U.S. vs Arg.	Argent. vs Brazil	U.S. vs Brazil	U.S. vs Arg.
<i>Value (€/100 kg) differences (compare to table 1)</i>									
Protein €	-0.54	-0.45	+0.12	-0.72	-0.56	+0.16	-1.01	-0.79	+0.22
Energy €	-0.37	+0.09	+0.46	-0.37	+0.15	+0.52	-0.80	+0.62	+1.43
Dig. AA €	+0.22	+2.00	+1.75	+0.26	+0.56	+0.30	+0.40	+0.82	+0.41
Total €	-0.69	+1.64	+2.33	-0.83	+0.15	+0.98	-1.41	+0.65	+2.06

*Rest caused by differences in amino acid digestibility and mineral content (P), see table 10.

In conclusion

Hipro soybean meal from the United States has a € 1.50-16.40/1000 kg higher value (absolute) than Brazilian Hipro SBM. Compared to the Argentinean origin the added value of U.S. SBM is € 9.80-23.30/MT. U.S. Hipro soybean meal has the highest added value for swine (€ 16.40-23.30) and broiler (€ 6.50-20.60) feeds, followed by layer feeds (€

1.50-9.80/MT). Differences in the energy and digestible amino acid + P content together contribute more to the added value of Hipro soybean meal than differences in the protein content.

On an equal protein content basis the value differences (in energy, mineral and digestible amino acid content) are € 6.30-20.90 (U.S. vs Brazil) and € 8.20-22.10/MT (U.S. vs Arg).

1. Introduction

Swine and poultry feeds are formulated via a Least Cost Formulation (LCF)-program to evaluate the value of soybean meal of different quality (origin) and different regions (with differing feedstuff prices/ availability). Market and future prices of feedstuffs for the Dutch feed industry of week 5 are used for the February-April and May-July period. Current feedstuff prices obtained from the feed industry in Poland and Romania were used. For Spain feedstuff prices from the Cambra Oficial de Comerc Industria i Navegacio de Barcelona were used. For a listing of all feedstuff prices for the different regions and periods see table 2 in the Appendix. Note that the same feedstuff restrictions and nutrient requirements are used for all LCF's. Premix, production and marketing costs are not included. Matrix values for the different origins of analyzed soybean meal samples are used. See the Appendix (table 1) for approximate analyses and nutrient values used.

2. Feedstuff market developments the Netherlands

The prices of soybean meal has continued to decrease in the New Year, although the decrease has been less from week 2 to 5 (€ 0.60/100 kg) than previously from week 48 to 2 (€ 2.50). The May-July price is considerable lower than the current prices indicating that the soybean meal prices will decline as soon as the new harvest from South America becomes available. The future price however is only slightly lower than € 400/ton and has decreased only slightly further compared to week 2 (-€ 0.30). The soybean meal prices remain high because of a high demand, despite a record harvest in the US and an expected large harvest in South America.

The price of all grains, except maize, have decreased. Grain by-products have decreased in price (wheat bran and maize DDGS) as well. Fats & oils all have decreased in price with the exception of soy oil. The future May-July price of the grains, grain by-products and fats & oils are similar to the current prices, indicating that these feedstuff prices are not likely to change until the new harvest. Dry conditions in South America have increased maize prices on the world market and grain prices in the EU.

Feed costs of all pig and poultry feeds have decreased, based on the current prices. Future feed cost (May-July) are lower than those of February-April. Poultry (specifically broiler) feeds have decreased the most in price and will decrease the most in May-July.

3. Shadow prices soybean meal by origin, the Netherlands

The Hipro (49/3.5) soybean meal price for February-April has decreased with € 0.60 to € 42.40. This is less than the € 2.50 decrease from week 48 to 2 but that was after the increase with € 1.50 from week 45 to 48. Once again the soybean meal price has downward trend. The May-July price is (at € 38.60) € 3.80 lower than currently, but nevertheless still historically high.

Rapeseed expellers (-€ 0.80), sunflower seed meal (-€ 0.20) and maize gluten feed meal (-€ 0.80) have all decreased in price along with soybean meal. Maize DDGS (-€ 2.40) decreased significantly more in price but rapeseed meal increased in price (+€ 0.70).

Quite significant for the feed costs is the decrease in the grain prices (all except maize, which increased € 0.40). Rye decreased € 0.10, triticale € 0.20, wheat € 0.30 and barley € 0.50. Wheat bran decreased € 0.60 in price and maize gluten feed meal € 0.80.

The fats & oils decreased in price along with the grain, except soy oil and the 20% linoleic fatty acid mixture (which both increased in price). The palm oil fatty acid price decreased with € 0.80, while palm oil decreased € 1.20 in price. The price of the 20% linoleic fatty acid mixture is now € 5.00 higher than that of the palm oil fatty acids.

The price spread between toasted soy beans and Hipro soybean meal increased from € 2.20 to € 2.80, in line with the higher soy oil price. Resultantly both soy oil and toasted soy beans are less attractive.

Hipro soybean meal is now not attractive for swine feeds, except the starter pig, at this relatively high price. The most attractive protein sources for all feeds are: maize DDGS, offered for € 23.00 and rapeseed expellers, offered for € 26.00. Toasted soybeans are only used in broiler feeds (because of limitations on the fats & oils addition), for layer feeds they are not interesting. Maize gluten meal (60% crude protein), offered for € 85.50, is only marginally attractive for broiler feeds and peas, offered for € 26.00 only for pig and sow feeds.

The attractiveness of maize has decreased swine feeds, it has been replaced with triticale. Rye usage is still maximised, despite the low price decrease. Maize DDGS is attractive and the usage has increased due to the decreased usage of maize in swine feeds. Maize DDGS usage is only at the maximum inclusion rate in pig, sow, layer and the broiler finisher feeds. In pig and layer feeds 10% is used and the broiler finisher feed 5%. Rapeseed meal is unattractive but rapeseed expellers are used in all pig and poultry feeds to the maximum. The maize gluten meal inclusion is 3% in the broiler grower feed.

Animal fat (lard) is with a price of only € 58.50 the cheapest fat source available. Palm oil fatty acids are with a price of € 60.50 substantially cheaper than plant oils (palm oil and soy oil). The 20% linoleic acid fatty acid mixture has increased substantially in price, making it almost as expensive as palm oil. The usage of fat & oil has increased in pig and layer feeds, mainly due to the lower maize usage. The usage of fat & oil is limited

because of the high grain usage. Also high energy and protein rich feedstuffs like maize DDGS and rapeseed expellers are also very attractive, specifically for pig and layer feeds. Low energy protein sources like rapeseed and sunflower seed meal are therefore not used. Beet pulp and wheat bran are relative expensive with lower grain price. Peas and palmkernel meal (maximum 5% inclusion) are attractive for pig feeds. Toasted soybeans are only used in broiler feeds (because of the maximum fat & oil addition). Hipro soybean meal usage is highest in layer and broiler feeds, it is the primary protein sources in these feeds.

High energy protein sources like rapeseed expellers have a high value even with the lower Hipro soybean meal price and a high usage of maize DDGS (€ 28.27–28.41 for rapeseed expellers versus € 23.59-23.73 for rapeseed meal in the pig grower/finisher). Product availability might be a problem (a recent fire in a plant in Germany also increased the price). The shadow price for maize DDGS is € 23.30-23.61 in the pig grower/finisher feeds while the market price € 23.00 is. This gives a spread of € 0.30-0.61 (was € 1.32-2.38) at the maximum inclusion rate. This shows that even with these lower grain, protein and fat prices it is still very attractive

In sow feeds maize DDGS is even more attractive and the usage rate higher (maximised at 15%). The shadow price is € 23.38-24.91. In all layer feeds the usage rate is 10% and the shadow prices ranges from € 27.98-28.13. Even in the broiler finisher the shadow price is € 23.35, at a usage rate of 5%. Maize gluten meal has a shadow price of € 67.36-67.56 in layer feeds and € 83.94-5.46 in the broiler feeds. Peas are unattractive in poultry feeds (shadow price is € 23.93-24.94), but are used extensively in grower/finisher pig and lactating sow feeds (shadow price is € 26.12–26.27). Lopro sunflower seed meal has in layer feeds a shadow price of € 18.30-19.19, while the market price € 19.30 is.

Soybean meal usage has decreased in pig, sow and layer feeds for the February-March period but will increase again in the May-July period with lower soybean meal prices. Soybean meal has mainly been replaced with rapeseed expellers, maize gluten, maize DDGS and peas. The usage of synthetic amino acids is still maximised and high protein grains like rye and triticale are used in swine feeds. In the layer feed a limited amount (7-13%) wheat is used.

In pig(let) starter feeds soybean meal the usage rate is 12%. Maize DDGS usage is highest and of most interest in (gestating and lactating) sow feeds. In pig feeds the maximum usage is limited to 10% because of the poor protein quality and C18:2 limitations. Also in layer feeds maize DDGS is of more interest than in broiler feeds. Wheat bran is attractive for the low energy pig and sow feeds but not for layer feeds (since maize DDGS usage is high). Other high fiber sources of interest in pig feeds are palm kernel meal. Beet pulp usage is very low in sow feeds. Grain by-products like maize gluten feed meal are not attractive for layer feeds. Only limited amounts of wheat DDGS are available, it is higher in protein but substantially lower in energy than maize DDGS. The value of both maize DDGS and rapeseed expellers decreases with lower grain and fat

& oil prices as well as with decreasing prices of protein rich feedstuffs like soybean meal.

The grain price have changed as follows: maize is now € 188/ton (was € 184 in week 2). Rye has decreased to € 182/ton and triticale € 192/ton. Wheat (€ 200/ton) is still considerable more expensive than other grains, although it has decreased slightly more in price than rye and triticale in the last month. The future grain prices for May-July are similar to the January-March prices, indicating that the current prices are not expected to decrease rapidly, but can obviously fluctuate (downward or upward). Increasing maize prices, due to an increased demand from the U.S., can increase the prices of the European grains (and grain by-products) too as export of grains from Europe might increase.

Presently rye is the most attractive grain for swine feeds since the protein content is higher of that of maize (but the energy content lower). Triticale is for the same reason interesting but more expansive. The grain usage is similar in the swine feed formulations for May-July (the only major change is that peas are replaced with Hipro soybean meal). The spread between the wheat and maize price has changed in favour of wheat in layer feeds. Nevertheless the high energy content makes maize very attractive for layer feeds. The usage of wheat is only 7-13% in the layer feeds (February-April period only), the value is € 20.08-20.11 at a market price of € 20.00 for wheat. The added value of wheat over maize is therefore € 1.28-1.31. Maize usage is maximised in broiler feeds, in layer feeds 49% is used. Maize DDGS usage can limit the usability of maize in swine feeds (restrictions on linoleic acid (C18:2) content in the feed) and the other way around, however under the current circumstances maize is less attractive in pig feeds (shadow price € 18.99 in grower/finisher, giving only a € 0.19 spread over the market price of € 18.80).

Swine feed formulations are based on rye, maize, triticale and barley. Layer feeds are maize and broiler feeds maize + wheat based. In the Netherlands the amount of maize is restricted in broiler feeds because of 'white chicken meat' or (yellow) fat colour concerns, while in layer feeds a minimum amount of maize is used for egg yolk colouring.

The shadow price of Hipro is € 41.87-42.09 in the grower/finisher pig and € 41.38 in the lactating sow feed at the market price of € 42.40. The price of Hipro soybean meal is therefore € 0.31-1.02 too high for usage. The shadow price of the Lopro in the same feeds is € 38.29-38.53 and € 38.37 at the market price of € 39.60, making Lopro is € 1.07-1.31 too expensive). The difference in value between Lopro and Hipro soybean meal is € 3.85-4.11 in these pig and sow feeds (this was € 3.47-3.53 in report nr 12). Both Hipro and Lopro have decreased € 0.60 so that the difference in market price is still € 2.80. Lopro soybean meal has decreased relatively more in price than the Hipro, however the spread between the two qualities has increased. This means the relative value of the Hipro quality has increased (higher maize DDGS usage). Altogether the Lopro quality is too expensive compared to Hipro soybean meal.

The shadow price for Hipro soybean meal in layer feeds is € 42.68-43.31 and € 43.39-48.08 in broiler feeds. Lopro soybean meal is also priced (€ 1.81-1.97) too high for layer feeds compared to Hipro, i.e. the value is € 4.61-4.77 lower than that of Hipro soybean meal in layer feeds (also showing that Hipro has a higher value over Lopro in layer than pig feeds).

The shadow price of maize gluten feed meal is € 14.28-14.74 in pig and € 18.17 in lactating sow, but € 18.27-18.99 in layer and only € 8.07 in broiler finisher feeds. Wheat bran is unattractive in layer feeds due to the high usage of maize DDGS (shadow price € 15.37-15.93) but it is used in the low energy pig and sow feeds. Beet pulp is attractive as a NSP-rich feedstuff for gestating sow feeds only. A price of € 58.50 for animal fat is used, is the most attractive fat source. Palm oil fatty acids are the most attractive plant oils but € 2.00 more expensive. The 20% linoleic acid fatty acids mixture is no longer attractive. The usage of fat & oil has increased mainly in pig and layer feeds due to the replacing of maize with triticale and/or wheat. Palm oil has decreased € 1.20 in price, while palm oil fatty acids decreased less (€ 0.80). Soy oil increased € 2.50 in price so that soy oil is now again € 4.20 more expensive than palm oil. Rapeseed expellers and maize DDGS are more attractive energy sources for pig and sow feeds and additionally toasted soybeans for broiler feeds.

The May-July prices for the plant oils are similar to the current prices. Palm oil fatty acids remains at € 60.50 significantly more attractive than the 20% linoleic acid fatty acids mixture at € 66.50 or palm oil at € 65.80. The usage of fatty acids usage is maximised in broiler feeds, both palm oil fatty acids and soy oil are used next to lard.

Resultantly the compound feed costs of all feeds for February-March have decreased, compared to the January-April period of week 2 (Soybean meal quality by origin report no 12/2013). Soybean meal usage has decreased in grower/finisher pig, lactating sow and layer feeds. The lower grain and protein (soybean meal) prices affect feed costs most of pig and broiler feeds, in layer feeds the savings are offset by the higher maize price. For the May-July the feed costs of all feeds are lower due to the lower protein (soybean meal) prices, specifically those of broiler feeds.

In table 1 the shadow prices of the different qualities soybean meal are given in feed formulation for different species and periods.

Table 1. Shadow prices of soybean meal by origin, the Netherlands

Period	Febr.-April (SBM € 42.40)				May-July (SBM € 38.60)			
	CVB	Arg.	Brazil	U.S.	CVB	Arg.	Brazil	U.S.
Swine Gr/Fin.	41.94	40.73	41.42	43.06	39.36	37.69	38.23	39.76
Layer Phase2.	44.62	41.85	42.68	42.83	39.98	38.11	38.83	39.06
Broiler Finisher	45.18	42.10	43.51	44.16	44.93	38.29	39.50	40.14

The shadow price of the CVB Hipro soybean meal should be interpreted as the value against other available protein sources which could be used as 'alternatives' like

rapeseed meal/expellers, maize/wheat DDGS, wheat bran, peas and sunflower seed meal. The shadow price (= maximum price for inclusion or an inclusion rate change) of the, generic, CVB soybean meal has decreased in pig feeds compared to week 2 (see report no 12/2013) due to the price decrease of mainly soybean meal but also of other protein rich feedstuffs. The shadow price of the CVB Hipro soybean meal has increased in poultry feeds, due to higher usage of 'alternate proteins'. Or in other words the increase in the spread between market and shadow price of Hipro soybean meal in poultry feeds indicates that Hipro soybean meal has become more attractive for poultry feeds, although the usage is decreased slightly. For the pig feeds the shadow price decreased € 1.84 with a market price decrease of € 0.60. The price decrease of € 2.40 of maize DDGS and the possibility to use more maize DDGS (because of a higher maize price), decreases the value and usage rate of Hipro soybean meal in these feeds. In layer feeds maize DDGS and rapeseed meal usage is already maximised and broiler feed formulations are more 'fixed'.

For the May-July period the Hipro soybean meal price is reduced by € 3.80. Hipro soybean meal becomes much more attractive for all feeds. The spread between market and shadow price of Hipro soybean meal in pig feeds has increased from -€ 0.46 to +€ 0.76 and the usage is once again 3% (see table 2). On the other hand the spread decreases for poultry feeds in that period as usage increases again.

In broiler feeds the value of Hipro soybean meal is high because of the high demand for digestible essential amino acids and energy. The high value of U.S. soybean meal in broiler feeds shows the relative high costs of energy (and digestible amino acids) in formulating. Maize DDGS usage can decrease Hipro soybean meal usage, but not to the extend as would be expected on a per unit of protein basis: i.e. Hipro soybean meal usage is reduced with 1% when 3% maize DDGS is added in swine feeds.

Although the price of soybean meal has decreased, the prices of other protein rich feedstuffs have decreased more so that no Hipro soybean meal is used in the pig grower/finisher and sow feeds(only in the pig starter feeds). Peas are attractive (5-12% usage) and have for the most part replaced Hipro soybean meal in these feeds. Protein is also obtained from protein rich grains (rye, triticale and barley), maize DDGS and rapeseed expellers. Rapeseed expellers are much more interesting than rapeseed meal at these high fats & oils prices. They are used in high amounts (10%), even in the low energy grower/finisher pig and lactating sow feeds, although the usage maize DDGS is maximised too. In poultry feeds rapeseed expellers are also preferred (and usage is maximised). Rapeseed meal and expellers usage is maximised due to the presence of glucosinolates (an anti nutritional factor affecting feed intake). Soybean meal usage is still 12% in the pig starter feed. For May-July Hipro soybean meal usage is once again 3-5% in the grower/finisher pig and lactating sow feeds.

Although the addition of maize DDGS is high and that of soy protein increased, the crude protein content is not high in all pig feeds. The usage of synthetic lysine is maximised since the bio availability of lysine in maize DDGS is very low. A high usage of maize DDGS

will increase the crude protein content of feeds and make higher quality protein sources more attractive.

In layer feeds the usage of Hipro soybean meal is decreased only slightly (to 13-17% in February-April but increased again to 14-18% in May-July) because of the relative high price. Toasted soybeans are not used either in layer feeds. Toasted soybeans are only attractive for broiler feeds because the usage of additional fats & oils prices is maximised. Wheat has partly replaced Hipro soybean meal in the layer feeds because already 10% maize DDGS and 2.5% rapeseed expellers are used. Maize gluten meal is attractive (3.0% inclusion) in the broiler grower feed. Peas are not attractive for any of the broiler feeds. In broiler finisher feeds the usage of Hipro soybean meal is still 12%.

Toast soybeans are priced unattractive compared to Hipro soybean meal (€ 42.40) and soy oil (€ 70.00) in February-April. The price of toasted beans is at € 44.80 lower than the formula: 75% Hipro + 7.5% maize + 17.5% SBO = $42.40 \times 0.75 + 18.80 \times 0.075 + 70.00 \times 0.175 = € 45.46$. In other words the spread can be as high as € 3.06 (was € 2.44 in report nr 12) while toasted soybeans are only € 2.40 more than Hipro soybean meal. Toasted soybeans are nevertheless unattractive because when the price of animal fat is used instead of soy oil, the value of toasted soybeans drop to € 43.45. Because fat addition is maximised, 13-15% toasted soybeans are added to broiler finisher feeds.

Hipro soybean meal is therefore still an attractive protein source next to rapeseed expellers, maize gluten, and maize DDGS. The usage rate of Hipro soybean meal is:

1. 12% in the starter feeds. No usage in pig grower/finisher and lactating sow feeds in February-April, but in May-July 3-5% in the pig grower/finisher and 3% in the lactating sow feeds
2. 13-18% in the layer feeds, (0.4-1.3% soy oil usage)
3. 12-20% in broiler grower/finisher feeds, (additionally toasted soybeans (6-15%) are used as a protein and fat source (no soy oil usage).

Therefore poultry feeds are the most interesting for soybean meal marketing.

Value differences (€/100 kg) of soybean meal of differing qualities in the Netherlands

Table 2 lists the difference in value of the three origins compared to the generic product offered on the Dutch market for the different periods.

Table 2. Absolute differences in value of different soybean meals compared to generic product

Period	Febr.-April (SBM € 42.40)				May-July (SBM € 38.60)			
	CVB	Arg.	Brazil	U.S.	CVB	Arg.	Brazil	U.S.
Swine Gr/Fin.	-0.46	-1.67	-0.98	+0.66	+0.76	-0.91	-0.37	+1.16
Layer Phase2.	+2.22	-0.55	+0.28	+0.43	+1.38	-0.49	+0.23	+0.46
Broiler Finisher	+2.78	-0.30	+1.11	+1.76	+1.76	-0.31	+0.90	+1.54

As noted the approximate analyses and the nutrient values of the different qualities

soybean meal have been obtained from Prof. Mateos. Analyses of the 2012 harvest period of the different origins are used. The matrix values of the generic CVB Hipro soybean meal and the different origins are listed in table 1 of the Appendix. The crude protein content of CVB Hipro soybean meal is on average 46.8% but varies considerable. The (digestible) amino acid content as well as the energy content varies with the protein content and protein digestibility. Most energy values of the generic Hipro soybean meal are lower than those of Mateos (consequently the different origins are compared among each other). The crude protein content of the Brazilian 46.9% is comparable to the generic CVB Hipro soybean meal. The digestible amino acid content for both pigs and poultry of the generic CVB Hipro soybean meal is close to the U.S. 46.2% crude protein quality of Mateos, although the protein content is lower. Resultantly the higher NE and AME content of the soybean meal from Argentina and Brazil is compensated by the lower digestible amino acid quality compared to the generic Hipro soybean meal. Soybean meal from the U.S. has an equal or higher nutrient values for digestible amino acids compared to the generic CVB Hipro soybean meal and the highest energy content of all soybean meal products. This is reflected in the shadow prices in table 2 (see also table 11 'price effect of variation in nutrient value').

With the decreased market price of Hipro soybean meal and the other protein rich feedstuffs, the shadow price of the generic CVB Hipro soybean meal is € 0.46 lower than the market price for the swine grower (this was € 0.78 higher than the market price in report no 12), € 2.22 higher in the layer (was € 0.23) and € 2.78 in the broiler finisher (was € 0.96). Although Hipro soybean meal is unattractive for pig and sow feeds it has become much more attractive for poultry feeds, even though the inclusion rate is here also reduced. Lopro soybean meal can be used in swine and layer feeds but in general the price difference is not low enough to compensate for the lower protein and energy content. The value of soybean meal from Brazil is higher than that of Argentina for feeds of all species but soybean meal from the U.S. has the highest value. In broiler feeds the additional value of U.S. soybean meal is highest over that from Argentina and Brazil.

In the May-July period the additional value of higher quality Brazilian and U.S. soybean meal (over that from Argentina) decreases in all feeds due to the future price decrease of Hipro soybean meal. The usage of soybean meal increases consequently. The absolute values changes significantly more (-€ 3.80) than value differences between the different origins (compare tables 1 and 3). In broiler feeds where the usage of soybean meal and additional fats & oils is highest, the value of high quality protein sources is decreased less than in layer and pig feeds. The added value of high quality soybean meal from the U.S. is highest in pig and broiler feed formulations, again showing the increased value of a higher energy content. The energy and digestible amino acid levels for the different qualities soybean meal are given in table 1 of the Appendix.

Table 3. Relative differences in value of the different soybean meals compared to the Argentinean product

Period	Febr.-April (SBM € 42.40)				May-July (SBM € 38.60)			
	Origin	CVB	Arg.	Brazil	U.S.	CVB	Arg.	Brazil
Swine Gr/Fin.	N/A	0	+0.69	+2.33	N/A	0	+0.54	+2.07
Layer Phase2.	N/A	0	+0.83	+0.98	N/A	0	+0.72	+0.95
Broiler Finisher	N/A	0	+1.41	+2.06	N/A	0	+1.21	+1.85

From this table can be concluded:

1. The market price of Hipro soybean meal in the Netherlands has decreased € 0.60 compared to week 2 (see report no 12) but is less compared to the price decreases of other protein sources. The future price for the May-July period is € 3.80 lower.
2. Toasted soybeans are priced attractive compared to Hipro soybean meal in feed formulations where both soybean meal and soy oil are used because the soy oil price has increased significantly. Toasted soybeans are only used in broiler feeds because of limits in the fats & oils additions.
3. Lopro soybean meal is unattractive compared to Hipro soybean meal for all feeds.
4. Hipro soybean meal usage has decreased in feeds for all species, the relative high price results that no soybean meal is used in pig grower/finisher and sow feeds. The usage is still high in layer than broiler feeds because of the limited possibilities for usage of other protein sources.
5. The added value of higher quality Hipro soybean meal has increased in pig and broiler feeds despite the lower feedstuff prices (soybean meal, other protein rich feedstuffs, grains and the fat & oils). However with a further (future) decrease of the soybean meal price, the added value of higher quality Hipro soybean meal will decrease slightly in all feeds.
6. The highest added value of high(er) quality soybean meal is obtained in pig and broiler feeds. The usage rate of soybean meal is still highest in layer feeds.
7. U.S. soybean meal is € 2.07-2.33/100 kg more worth than Argentinean soybean meal in swine feeds, € 0.95-0.98 in layer feeds and € 1.85-2.06 in broiler feeds.
8. U.S. soybean meal is € 1.53-1.64/100 kg worth more than Brazilian soybean meal in swine grower/finisher feeds, € 0.15-0.23 in layer feeds and € 0.64-0.65 in broiler grower/finisher feeds. The additional value of U.S. soybean meal is highest over that from Brazil in pig feeds in both periods.

3.1 Shadow prices soybean meal by origin, Spain

Feedstuff prices of week 5 were obtained from the Cambra Oficial de Comerç Industria i Navegacio de Barcelona. Some feedstuff prices, compared to report no 12/2013, have increased while other have decreased. Most significant are the price increases of maize, rye and those of the protein rich feedstuffs (soybean and rapeseed meal). Wheat, barley and sunflowerseed meal have decreased in price. All fats and oils have decreased in price, animal fat the most. Hipro soybean meal has decreased in price in the Netherlands and Romania but increased in Poland too. The price in Spain is considerable higher than

in the Netherlands and Poland.

Feed costs for pig and layer feeds have therefore increased slightly, but those of broiler feeds have decreased. The feed composition consists mainly of whole grains like maize, milo corn and wheat with soybean meal, rapeseed meal and toasted soybeans as protein sources and animal fat and soy oil as additional energy sources. Prices for by-products like maize gluten feed meal and maize DDGS are not listed, although the latter is widely used.

Maize (€ 18.15) is the most attractive priced grain for pig and layer feeds; wheat (€ 21.70) and milo corn (€ 19.50) are too expensive. Rye (€ 18.30) has a low inclusion rate in pig feeds although the cost of protein supplementation is high, barley (€ 18.40) is not attractive. For layer feeds wheat is not attractive since the price is € 3.55 higher than that of maize. Maize is attractive for broiler feeds but since maize usage is restricted, milo corn and wheat are used additionally in broiler feeds. Likewise maize usage is restricted by the C18:2 content in pig feeds so that rye is used as an additional starch and protein source. In layer feeds maize usage is over 60%. Peas are likely not attractive for the broiler and layer feeds (shadow price € 24.27 in layer and € 26.94 in broiler feed, although no market price is given). Wheat bran is hardly attractive in pig and not in layer feeds. The shadow price is € 19.64 in pig feeds with only a 1.5% inclusion rate. In layer feeds the shadow price is only € 15.86 at a market price of € 17.50. Additionally beet pulp is attractive (usage rate 5.5%) for pig feeds.

The shadow price in pig feeds for wheat is € 19.56, milo corn € 19.39, triticale € 19.61 and barley € 18.03. All shadow prices are in comparison to maize (at € 18.15) and rye (at € 18.30). The value of high protein grain is higher than that of maize but only when the starch (energy) content is high too (wheat and triticale). The high fats & oil prices still increase the value of maize over other grains, even though price of soybean meal and other protein rich feedstuffs have increased. The shadow price of milo corn is € 17.53 in layer feeds again benchmarked at the maize price of € 18.15. In broiler feeds both wheat and milo corn are used, consequently the shadow price for milo corn is € 22.07 and that of wheat € 22.48. In broiler feeds the shadow price for milo corn is higher than the maize price because maize usage is maximized (white meat). In swine feeds the usage of maize and milo corn is maximised too because of bacon quality (max. C18:2) and the tannin content of milo corn. Maize is the only grain used in layer feeds and the primary grain in pig feeds.

Soybean meal usage has only decreased slightly in broiler feeds due to the higher price. In the pig feed soybean meal usage has increased because of a higher maize usage in layer feeds soybean meal can replace sunflowerseed meal. Rapeseed meal usage is maximised in pig in layer feeds, the usage is low in broiler feeds. Hipro sunflowerseed meal is also attractive for pig and layer feeds. Hipro soybean meal is the most important protein source in pig and poultry feeds.

Maize (or wheat) DDGS is not offered. Maize DDGS is in general of most interest in sow and layer feeds but is also used in pig and broiler feeds to a limited extent. The shadow price for maize DDGS is € 29.73 in pig grower/finisher feeds (inclusion rate 2.2%). Since maize is used to the maximum it does restrict the usage rate and value of maize DDGS (due to the max. C18:2 content) in pig feeds. In the layer phase 2 feed the shadow price of maize DDGS is € 29.45 and € 28.83 in broiler finisher feeds (at a usage rate of 1.7%). Maize DDGS will more likely be an attractive feedstuff for pig and layer feeds than broiler feeds in Spain, since inclusion rates in general are highest in sow and layer feeds (in Poland the price for maize DDGS is € 21.65 and in the Netherlands € 23.00, this is below the shadow price in Spain).

A price for rapeseed expellers was not available. Rapeseed meal is attractive for layer (shadow price € 31.03), broiler (shadow price € 28.51) and pig feeds (shadow price € 31.33) at a price of € 28.20. Consequently the usage of rapeseed meal is maximised in pig and layer feeds. Rapeseed meal is € 2.20 higher in Spain than in the Netherlands and € 4.15 than in Poland.

Also Hipro sunflowerseed meal (34% CProt) can be attractive for layer and pig feeds. The shadow price in pig feeds is € 26.72 and in layer feeds € 26.60. The price of the Hipro quality is € 21.40 and the Lopro quality € 17.00 in Spain compared to € 19.30 for the Lopro quality in the Netherlands. A price for peas was not available in Spain, in the Netherlands they are attractive for pig feeds. In Spain in broiler feeds the shadow price is € 26.94.

The maize and wheat prices are higher in Spain than in Poland and Romania. Grain prices are in general lowest in Eastern Europe. Maize and barley are cheaper in Spain than the Netherlands, wheat is significantly more expensive. The maize price in Spain is € 0.65 lower and barley € 0.40 than in the Netherlands, rye is € 0.20 and wheat is € 1.70 more expensive. Milo corn is not available in Northern and in Eastern Europe availability is limited. In Spain it can be priced very attractive but currently the price is € 1.35 more than maize. The milo corn price in Romania is € 5.80 lower.

Plant protein prices have increased in Spain with the exception of sunflowerseed meal. Hipro soybean meal increased € 1.90 compared to report no 12/2013, rapeseed meal increased € 1.00 and Hipro sunflowerseed meal decreased € 1.00. The Hipro soybean meal price is now € 2.50 higher than in the Netherlands (where the price decreased € 0.60) and € 1.30 higher than in Poland (where the price increased too but only with € 1.00). Fish meal on the other hand is much more attractive for poultry feeds in Spain (€ 88.00 versus € 113.50 in the Netherlands). Soy oil has decreased € 1.00 in price and is now € 1.50 lower than palm oil. Palm oil is € 2.20 more than in the Netherlands. Fatty acid mixtures are in Spain € 0.50 less than palm oil. Fatty acid mixtures are in Spain € 7.00 more expensive than palm oil fatty acids in the Netherlands. Animal fat is in the Netherlands even € 12.50 cheaper than in Spain!

Consequently pig and layer feed costs in Spain are 4% higher than in the Netherlands and broiler feed costs are 6% higher. Maize DDGS usage however, can reduce feed costs

in swine and layer feeds in Spain significantly.

In table 4 the shadow prices of the different qualities soybean meal are given in feed formulation for different species.

Table 4. Shadow prices of soybean meal by origin, Spain

Period	Week 5, SBM € 44.90			
Origin	CVB	Arg.	Brazil	U.S.
Swine Grower	51.01	44.63	45.22	45.80
Layer Mid/Normal	45.08	44.33	45.23	45.27
Broiler Finisher	45.75	44.32	45.41	45.75

The generic CVB Hipro soybean meal is used in all feeds and serves as the benchmark to determine the value of the other qualities soybean meal by origin (see Appendix for matrix values used). The shadow price of the generic CVB Hipro soybean meal is similar for layer feeds and higher for pig and broiler feeds. The shadow prices of the different qualities soybean meal are higher for pig and layer feeds in Spain than the Netherlands (and Poland), because the soybean meal price is higher. On the other hand a high usage of maize DDGS in pig and layer feeds in the Netherlands and Poland increases the value of (high quality) soybean meal. The shadow price of soybean meal in Spain has increased in all feeds and the usage has increased in pig and layer feeds because of increase of the prices of alternative protein sources like rapeseed meal.

The value of higher quality protein sources like U.S. soybean meal is determined by the costs of energy rich feedstuffs (which is high in Spain) and the usage of in general lower priced but poorer quality protein sources (specifically maize DDGS) as is common in pig and layer feeds. The added value of high quality soybean meal and usage has decreased only in pig and layer feeds. Alternative and cheaper protein sources like rapeseed meal (pig, layer and broiler feeds) and sunflowerseed meal (layer feeds) can replace part or all of the soybean meal. A high usage of maize DDGS in layer feeds potentially affects soybean meal usage most.

The spread between the shadow price and the actual market price of (the generic) soybean meal is € 6.11 in swine feeds (was € 0.07), followed by layer (€ 0.18, was € 1.27) and broiler (€ 0.85, was € 1.34) feeds. Due to the higher Hipro soybean meal price, the spread has increased in poultry feeds. Hipro soybean meal has become more attractive and more price sensitive in poultry feeds. In pig feeds, however, Hipro soybean meal has become more attractive due to the increased maize usage. Compared to report no 12/2013, usage of Hipro soybean meal increased 1% in pig and 4% in layer feeds. Usage of rapeseed meal, peas and sunflower seed meal increases the value of high(er) quality soybean meal in poultry feeds too, although the protein quality is good the energy value is low. Maize DDGS can be attractive in (high energy) sow and layer feeds and to a lesser extend in pig feeds. When available the maximum allowable amount will be used in

all sow feeds (when formulated with a NE-sow). Maize DDGS decreases soybean meal usage somewhat but increases the shadow price of (high quality) soybean meal. In broiler feeds toasted soybeans can be relatively attractive (because of high Hipro soybean meal and plant oil prices), reducing the Hipro soybean meal usage. In the lower energy layer feeds toasted soybeans are not attractive.

The usage rate of soybean meal is:

1. 10% in the grower/finisher pig feeds (without maize DDGS or sunflower seed usage)
2. 21% in layer feeds (without maize DDGS usage or sunflower seed usage)
3. 20% in the broiler grower/finisher feeds*

* Additionally 11% toasted soybeans are used as a protein and fat source in broiler feeds.

Value differences (€/100 kg) of soybean meal of differing qualities in Spain

Table 5. Relative differences in value of the different soybean meals compared to the Argentinean product

Period		Week 5, SBM € 44.90		
Origin	CVB	Arg.	Brazil	U.S.
Swine Grower	N/A	0	+0.59	+1.17
Layer Mid/Normal	N/A	0	+0.90	+0.94
Broiler Finisher	N/A	0	+1.09	+1.43

From this table can be concluded:

1. The price of Hipro soybean meal is higher in Spain than in the Netherlands and Poland. The price has increased € 1.90 in Spain, but only € 1.00 in Poland and decreased € 0.60 in Netherlands compared to last month (report no. 12/2013). In Romania, however, the Lopro quality decreased € 2.95.
2. At this higher soybean meal price, soybean meal usage has increased in pig and layer feeds due to other feed price changes. Usage remains high in broiler feeds.
3. The added value of all high(er) qualities soybean in Spain has decreased slightly due to the lower soybean meal and fats & oils prices. The added value of high(er) quality U.S. soybean meal is highest in pig and broiler feeds.
4. Soybean meal from the U.S. is € 1.17/100 kg more worth than Argentinean soybean meal in swine grower feeds, € 0.94 in layer feeds and € 1.43 in broiler feeds.
5. Soybean meal from the U.S. is € 0.58/100 kg worth more than Brazilian soybean meal in swine grower feeds, € 0.04 in layer and € 0.34 in broiler feeds.

3.2 Shadow prices soybean meal by origin, Poland

Feed costs for pig and poultry feeds, based on feedstuff prices of week 5, have increased in Poland compared to report no. 12/2013, pig feed costs have increased the most (+2%). All grains and protein rich feedstuffs increased in price, only the fat & oil prices decreased. Wheat and triticale increased the most in price, prices are lower than in the Netherlands and Spain but higher than in Romania. Animal fat decreased significant

more in price than soy oil.

The Hipro soybean meal price increased with € 1.00/100 kg which compensates the price decrease of € 1.20 from week 48 to 2. In the Netherlands the Hipro soybean meal price decreased with € 0.60 price from week 2 to 5 but in Spain the price increased € 1.90. In Romania the Lopro quality decreased € 2.95. The Hipro soybean meal price in Poland is now € 1.20 higher than in the Netherlands, but € 1.30 lower than in Spain. In contrast in Romania the price of the Lopro quality is € 1.75 higher. The trend towards decreasing prices for soy products seems to have reversed, at least temporarily in the Polish feedstuff market. The May-July future price of Hipro soybean meal in the Netherlands is € 3.80 lower than currently. For the longer term other protein rich feedstuffs are expected to decrease in price too, but rapeseed meal and maize DDGS increased slightly in price last month along with soybean meal. Weather conditions in North and South America influence the feedstuff market strongly. Recent dry conditions in South America might bring the soybean meal (and probably the corn) market down less than expected earlier (in anticipation maize prices have increased).

The maize price increased from € 15.95 to € 16.20, wheat from € 18.60 to € 19.30. Triticale went up from € 16.20 to € 16.65 and barley from € 18.70 to € 19.50. Wheat bran increased € 0.50 in price. Beet pulp stayed the same at € 16.90 in price; the price is € 7.20 lower than in the Netherlands.

Rapeseed meal increased € 0.70, which is in line with the increase in the Hipro soybean meal price. A price for rapeseed expellers is not available, typically the price is only slightly higher than that of rapeseed meal. Rapeseed meal is still very cheap in Poland, the price is € 1.95 higher in the Netherlands and € 4.15 in Spain. The price decrease of animal fat (-€ 4.05) makes rapeseed expellers less attractive compared to rapeseed meal (as an additional energy (fat) source). The maize DDGS price has also increased (+€ 0.70) to € 21.65, which is € 1.35 lower than in the Netherlands (the maize DDGS price decreased € 2.40 in the Netherlands) but € 8.20 higher than in Romania. This makes Maize DDGS very attractive in Poland compared to the Hipro soybean meal (since no price for rapeseed expellers was available).

Feed formulations are mainly based on maize and soybean meal + rapeseed meal + maize DDGS (layers), wheat + maize and soybean meal + maize DDGS (broilers) and maize + triticale and soybean meal + rapeseed meal + maize DDGS (swine feeds). The Hipro soybean meal usage has not decreased in layer and broiler feeds, despite the price increase, because alternative protein sources have increased in price too and usage is maximised in layer feeds. Hipro soybean meal usage has even increased slightly in the pig feeds where it has replaced part of the maize DDGS.

Rapeseed meal is very attractive as an 'alternative' protein sources for pig and layer feeds and used to the maximum, even though maize DDGS is also used. Rapeseed meal

can also be very attractive for broiler feeds but the value is substantially less due to the low energy content (usage <1%). The relative low grain (maize) and still relative high fat & oil prices make less energy dense feedstuffs unattractive. In layer feeds both maize DDGS and rapeseed meal are used to the maximum. In pig and broiler feeds the usage of maize DDGS is lower (4-5%).

The price of animal fat is € 67.85 in Poland and € 71.00 in Spain but only € 58.50 in the Netherlands. The soy oil priced has increased significantly in the Netherlands (to € 70.00), with a price decrease in Poland it is still more expensive (at € 72.60). Animal fat and palm oil fatty acids are the cheapest fat source in the Netherlands, in Poland no price is available for fatty acids (in Spain the price is € 67.50). Because of the relative high fat price, the protein and energy rich maize DDGS is very attractive in Poland. Also the value of rapeseed expellers is substantially higher than that of rapeseed meal. In layer feeds f.i. the value of rapeseed expellers is € 36.11 and in pig feeds € 30.22 compared to the market price of € 24.05 for rapeseed meal. The shadow price of rapeseed meal (bench marked against the Hipro soybean meal price of € 43.60) is € 28.93 in the swine grower/finisher, € 28.28 in layer and € 26.66 in broiler feeds. In summary, the addition of fats and oils is still low in layer feeds and none are used in pig feeds.

The current price increase of Hipro soybean meal has not resulted in a decreased usage in layer and broiler feeds (compared to report no 12/2013), on the contrary the usage increased slightly in pig feeds (from 6.1 to 6.5%) by replacing part of the maize DDGS. Hipro soybean meal is the major protein source in poultry feeds. Maize DDGS usage is maximised in layer feeds at 10% and in broiler feeds at 5%. The maximum usage rate of maize DDGS is highest in pig (up to 10%), sow (15%) and layer feeds (10%). But the usage is only maximised in layer and broiler feeds, in pig feeds it is 4.0%. Both rapeseed products and maize DDGS can only be used to a limited extend in animal feeds, but can nevertheless replace a significant amount of soybean meal. When, as presently, both maize and maize DDGS are attractive in swine feeds the C18:2 content in the pig finisher feed will be maximized for bacon quality so that maize DDGS usage is not maximised. The shadow price of maize DDGS is € 30.91 in the pig grower/finisher pig feeds, € 26.75 in the layer feeds and € 25.93 in the broiler finisher feed, especially in layer and pig feeds it is far above the market price of € 21.65. In the white meat broiler feeds the maize (10%) and maize DDGS inclusion is restricted (like in Spain and the Netherlands), reducing the shadow price of maize DDGS.

Wheat bran at a market price of only € 13.35 is only marginally attractive for pig feeds (usage rate <1%, although the shadow price is € 15.02). In pig and layer feeds wheat bran competes with maize DDGS, so it is also not attractive in layer feeds (shadow price € 12.48 with <1% inclusion rate). In sow feeds wheat bran can be used as a fNSP (fermentable complex carbohydrates) source resulting in higher inclusion rates. In pig feeds beet pulp is attractive (the shadow price is € 58.49 at a 5% usage).

The maize price increased with € 0.25 in Poland, € 0.15 in Spain and € 0.40 in the Netherlands, while in Romania it increased with € 0.35 (but the maize price is still € 1.40 lower in Romania than in Poland). The wheat price increased € 0.70 in Poland but decreased with € 0.30 in the Netherlands and Spain and € 2.35 in Romania. Triticale is cheapest of all grains in Poland (€ 16.65). Triticale is also attractive considering the higher protein content and prices. Triticale is even cheaper in Romania (€ 13.90). Maize is also very attractive in Spain and in the Netherlands, in the latter rye is also attractive for pig feeds. Grain by products prices like wheat bran (€ 13.35 versus € 16.10 in the Netherlands and € 10.70 in Romania) are priced low in Poland.

In summary grain, grain by-products and rapeseed products are least expensive in Eastern Europe. Fat sources and other protein sources are more compatible. The finished feed cost for swine feeds in Poland are 8% lower than in the Netherlands and layer feeds 5%, but broiler feed costs are 1% higher. The lower maize and rapeseed meal prices decrease feed costs in layer and pig feeds the most. Compared to Romania the ingredients costs for swine feeds are 17% higher, but those of layer feeds are similar and broiler feeds 2% lower (due to low milo corn and corn prices but higher soybean meal prices).

Table 6. Shadow prices of soybean meal by origin, Poland

Period	Market price week 5 (SBM € 43.60)			
Origin	CVB	Arg.	Brazil	U.S.
Swine Gr/Fin.	44.83	43.43	44.11	44.91
Layer Phase2.	44.19	42.98	43.98	44.15
Broiler Finisher	45.64	43.06	44.33	44.75

The shadow price of the CVB Hipro soybean meal has decreased in pig and layer feeds compared to last month (report no 12/2013), due to the higher price of Hipro soybean meal. In broiler feeds the value of the CVB Hipro soybean meal has even increased. The prices of 'alternate proteins' have increased too but apparently to a lesser extent than soybean meal, decreasing the value of soybean meal in pig and layer feeds. In other words the 'spread' between the market price and shadow price has decreased in swine (was € 31.96 and is now € 1.23) and layer feeds (was € 5.22 and is now € 0.59) but in broiler feeds it decreased only from € 2.44 to € 2.04. This shows that Hipro soybean meal has become more price sensitive as a protein source (due to the price increase) in pig and layer feeds. The spread between the shadow price and the actual market price of soybean meal is lowest in layer feeds, most protein is derived from soybean meal and usage is under the most pressure here.

Maize DDGS can only replace a limited amount of Hipro soybean meal since the amino acid quality is rather poor. Rapeseed meal usage impacts soybean meal usage in pig feeds the most (10% inclusion rate). Because rapeseed meal or expellers and wheat bran usage is limited in layer and broiler feeds, Hipro soybean meal usage remains high in poultry feeds. Rapeseed products can only be used to a limited amount in layer feeds to

reduce the risk of off flavour eggs. All pig and poultry feeds are formulated with the minimum crude protein requirement (15% pig-, 16%-layer and 20%-broiler feed). This shows the still high cost of protein supplementation and the extra value of concentrated high quality protein sources.

The value of the, generic, CVB soybean meal is highest in pig and broiler feeds. The value of high quality soybean meal however is highest in broiler feeds due to the higher requirements for digestible amino acids and energy. The relative high fat and protein prices in Poland keeps the value of higher quality Hipro soybean meal higher in broiler than layer feeds.

The usage rate of soybean meal is:

1. 6% in the pig grower/finisher feeds.
2. 16% in layer feeds.
3. 14% in the broiler feeds (along with 14% toasted soybeans).

Value differences (€/100 kg) of soybean meal of differing qualities in Poland

As stated in 3.0 the value differences of soybean meals of different qualities by using the matrix values obtained from Prof Mateos should be determined by comparing the 3 different soybean qualities among each other, see table below.

Table 7. Relative differences in value of the different soybean meals compared to the Argentinean product

Period	Market price week 5 (SBM € 43.60)			
Origin	CVB	Arg.	Brazil	U.S.
Swine Gr/Fin.	N/A	0	+0.68	+1.48
Layer Phase2.	N/A	0	+1.00	+1.17
Broiler Finisher	N/A	0	+1.27	+1.69

From this table can be concluded:

1. Feed costs are low in Poland and Eastern Europe mainly due to low grain, grain and biofuel by-products (DDGS and rapeseed products) prices.
2. The highest added value of high(er) quality soybean meal is obtained in pig and broiler feeds. Broiler feeds are most concentrated in digestible amino acids and energy.
3. The added value of U.S. soybean meal is lower in Poland in pig and broiler feeds compared to the Netherlands but higher in layer feeds.
4. Soybean meal from the U.S. is € 1.48/100 kg more worth than Argentinean soybean meal in swine feeds, € 1.17 in layer feeds and € 1.69 in broiler feeds.
5. Soybean meal from the U.S. is € 0.80/100 kg worth more than Brazilian soybean meal in swine grower feeds, € 0.17 in layer feeds and € 0.42 in broiler feeds.

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3.3 Shadow prices soybean meal by origin, Romania, Bulgaria, Serbia and Macedonia

Feedstuff prices for Romania were obtained in week 5. They tend to be similar to the prices in Bulgaria. Feedstuff prices in general are quite comparable between these different countries with the exception of soybean meal which tends to be more expensive in Serbia and Macedonia than Romania and Bulgaria. The comparisons below are based on the Romanian feedstuff prices but the general conclusions are applicable for the South Eastern European region including Serbia and Macedonia. Compared to last month (report no 12/2013) some feedstuff prices increased (most grains and peas) and others decreased (protein rich feedstuffs and oil), resultantly pig feed cost have decreased 4%, the layer feed cost 3% and those of broiler feeds 2%. Pig feeds can profit the most from lower maize DDGS and rapeseed meal prices, lower soybean meal prices are most significant for poultry feeds.

The main feedstuffs used in the feed formulations are maize + milo corn + triticale with soybean meal, peas and maize DDGS as protein sources. Peas are used in pig and broiler feeds as additional protein sources. Prices for Hipro soybean meal, sunflowerseed meal or rapeseed expellers were not available. The prices of maize, milo corn, triticale and barley have all increased in Romania since the last report but the price of wheat has decreased. Sunflower oil decreased also in price. Of the protein rich feedstuffs: the pea price is increased but DDGS products, rapeseed meal and soybean meal became cheaper. No Hipro soybean meal price was available in Romania, just like last month. Assuming a € 3.00-4.00 difference in value between Lopro and Hipro soybean meal, the Lopro soybean meal price of € 45.35 is extremely high. The Lopro soybean meal price in the Netherlands is € 39.60, while on the other hand the maize DDGS price is € 9.55 higher in the Netherlands.

All grains are substantially less expensive in both Poland and Romania than in the Netherlands and Spain. Furthermore the maize price is € 1.40 lower in Romania than in Poland, barley € 1.50, triticale € 2.75 and wheat is even € 3.40 cheaper. The milo corn price is currently € 1.10 lower than maize in Romania and therefore very attractive in pig feeds because the maize usage is limited. Milo corn is also available in Spain, there the price is € 1.50 higher than the maize price. Currently the milo corn price is € 5.80 higher, in Spain than in Romania.

In pig and broiler poultry feeds milo corn is the most attractive grain, usage is maximised at 25%. Maize is the most attractive grain in layer feeds. The shadow price of maize is € 16.72 in layer and € 23.16 in broiler feeds but € 14.93 in swine feeds. Both in pig and broiler feeds the maize usage is maximised by the C18:2 limitations (which also restricts maize DDGS usage). Wheat is used in layer feeds in low amounts as a supplemental protein source (shadow price € 16.67), due to the high soybean meal price. Wheat is too expensive for swine feeds (shadow price € 15.78). Triticale and milo corn are most attractive in swine feeds. The shadow price of milo corn is € 15.43 in swine feeds and

that of triticale € 16.13. This indicates again that triticale is more attractive than milo corn for swine feeds (higher protein content). The shadow price of milo corn is € 10.32 in layer, benchmarked at the maize price of € 14.80 (and wheat € 15.90). In broiler feeds the shadow price of milo corn is highest, at € 16.78. As long as the tannin content is low in milo corn it can substitute most of the other grains. The value of milo corn is in pig and broiler feeds less restricted by the C18:2 content.

Benchmarked at the price of Lopro of € 45.35 the shadow price of Hipro soybean meal in Romania in layer feeds is € 55.82 and € 59.18 in broiler feeds. In pig feeds the shadow price of Hipro soybean meal is only € 35.26. Lopro soybean meal is too expensive (shadow price € 32.43) because the (cheaper) alternate proteins are used. Consequently Hipro soybean meal can be sold at a premium of € 2.83 in pig feeds and € 10.47-13.83 in poultry feeds over the Lopro price. Compared to the last report no 12/2013 (table 8) the spread (between the value of Hipro soybean meal and the Lopro soybean meal price) has decreased significantly in pig feeds due to the higher soybean and lower maize DDGS price, but increased in poultry feeds. The added value of U.S. Hipro soybean meal has decreased considerably due to the lower sunflowerseed oil price. The price of toasted soybeans is in Romania substantially higher than in the Netherlands just like Lopro soybean meal. The soybean meal prices are not expected to decline until the new harvest of South America becomes available. The future Hipro soybean meal price (in week 5) for the May-July period in the Netherlands is € 3.80 below the February-April, that of Lopro is € 3.50 lower.

Considering the low grain prices and the (relatively) low prices of the DDGS products, Hipro soybean meal is an expensive protein source in Romania. Maize DDGS is offered for € 13.45, while the price € 21.65 is in Poland and € 23.00 in the Netherlands. Maize DDGS is used in all feeds including the broiler feed. Wheat DDGS is available for € 0.55 more than maize DDGS. Although the protein content higher is of wheat DDGS, its value is lower due to the low energy (fat) content than maize DDGS. Wheat DDGS has f.i. a shadow price of € 12.34 in pig feeds, where it is soonest attractive due to the restriction on the C18:2 content of the feed limiting maize DDGS usage. The shadow price of maize DDGS in swine feeds is € 18.94, € 13.99 in layer and € 19.04 in broiler feeds. But that of wheat DDGS € 9.72 in layer and € 7.35 in broiler feeds. The value of wheat DDGS is clearly highest in pig feeds but nevertheless € 6.60 lower than that of maize DDGS.

Rapeseed meal is now offered for € 19.30, which is substantially less than € 34.70 last month. It is very attractive in pig feeds (shadow price € 20.87), but it is too expensive for layer (shadow price € 18.81) and broiler feeds (shadow price € 12.65). The rapeseed meal price is € 26.00 in the Netherlands and is with € 24.05 also substantially higher in Poland. Rapeseed expellers and meal usage is in general high in pig feeds but not in poultry feeds. Peas are attractive for pig feeds (shadow price € 22.78 at a market price of € 21.75) and broiler feeds (shadow price € 23.73). At a 15% inclusion rate in broiler feeds and 14% in pig feeds they are replacing part of the soybean meal.

Sunflower seed oil is priced attractive at € 69.20 compared to soy oil in Poland but € 1.35 more expensive than animal fat in Poland. Compared to the Netherlands the price is higher than that of animal fat and palm oil fatty acids and an expensive energy source considering the low grain prices in Romania. Rapeseed expellers, toasted soybeans and maize DDGS are therefore considerable more attractive, limiting the usage of additional oil. High fat & oil prices decrease the value and usage of feedstuffs with a low energy content like rapeseed meal. The shadow price for rapeseed expellers is therefore € 40.53 in layer feeds compared to rapeseed meal € 18.81. In layer feeds toasted soybeans also have a high shadow price (€ 49.17) but are not used as a source of soy oil. In swine feeds no additional fat is added.

No price for sunflower seed meal was available. The shadow price is € 11.49 for the Lopro and € 15.00 for the Hipro in swine feeds, in layer feeds only the Hipro quality is attractive (at € 6.07). Significant amounts of Lopro sunflower seed meal can be used in swine and layer feeds (protein quality better than maize DDGS), however the still relative high fat & oil prices make these low energy feedstuffs less attractive, despite the (often) low price per unit of protein. Soybean meal is therefore still the most attractive protein source for poultry feeds next to maize DDGS.

Altogether the feed costs of the pig feeds are about 24% (!) lower in Romania than in the Netherlands and layer feeds 5%, broiler feeds are 3% more expensive. Compared to Poland pig feeds costs in Romania are 17% lower, but layer feeds costs are the same and broiler feeds are 2% more expensive.

Table 8. Shadow prices of soybean meal by origin, South Eastern Europe (Based on Romanian feedstuff prices)

Period	Market price week 5 (Lopro SBM € 45.35)			
Origin	Lopro CVB	Arg.	Brazil	U.S.
Swine Gr/Fin.	32.43	34.14	34.78	36.50
Layer Phase2.	46.92	55.88	57.92	58.92
Broiler Finisher	48.55	58.79	61.73	62.74

Lopro soybean meal is used only in poultry feeds. In pig feeds no soybean meal is used, rapeseed meal, maize DDGS and peas are used as protein sources next to triticale, maize and milo corn. In poultry feeds high amounts of plant oils are used to compensate for the low energy content. The shadow price of the generic Hipro soybean meal is € 32.43 in pig, € 46.92 in layer and € 48.55 in broiler feeds (compared to the Lopro price of € 45.35). Soybean meal usage is highest in layer feeds. The shadow price of the generic soybean meal has decreased in all feeds compared to report nr 12, due to the increased soybean meal and lower protein prices of the 'alternatives'. In pig feeds the shadow price has decreased the most (under the Lopro price). Consequently the shadow prices is lowest in pig feeds and the usage rate zero. The shadow prices of the Hipro soybeans in poultry feeds are high enough to secure good inclusion rates even at fluctuating prices. In all feeds the shadow prices are lowest for the Argentinean origin and highest for the U.S.

origin. In broiler feeds the U.S. origin has the highest shadow price. The added value of high(er) quality soybean meal is therefore highest in broiler feeds but the usage rate is highest in layer feeds.

The usage rate of soybean meal is:

1. 0% Lopro soybean meal in pig feeds (Grower/finisher)
2. 18% Lopro soybean meal in the layer (Phase 2)
3. 15% Lopro soybean meal in the broiler finisher*

* Additionally 14% toasted soybeans are used as a fat source.

Value differences (€/100 kg) of SBM of differing qualities in South Eastern Europe (Based on Romanian feedstuff prices)

As stated in 3.0 the value differences of soybean meals of different qualities by using the matrix values obtained from Prof Mateos should be determined by comparing the different soybean qualities among each other, see table 9.

Table 9. Relative differences in value of the different soybean meals compared to the Argentinean product

Period	Market price week 5 (Lopro SBM € 45.35)			
Origin	CVB	Arg.	Brazil	U.S.
Swine Gr/Fin.	N/A	0	+0.64	+2.36
Layer Phase2.	N/A	0	+2.04	+3.04
Broiler Finisher	N/A	0	+2.94	+3.95

Since the cost of fat addition is high (and the usage of high energy by-products like maize DDGS limited), the added value of high quality soybean meal with more energy is high in all feeds but specifically in broiler feeds (compare the € 3.95 added value of U.S. soybean meal over Argentinean origin for broilers to € 1.85-2.06 in the Netherlands, € 1.43 in Spain and € 1.69 in Poland). Feeds for all species are formulated with the minimum crude protein requirement (15 pigs, 16%-layer and 20%-broiler). This shows the high cost of protein supplementation and the extra value of concentrated high quality protein sources. The high usage rate in poultry feeds also shows that soy protein is an attractive feedstuff, especially in the form of Hipro soybean meal, in South Eastern Europe.

From this table can be concluded:

1. Grain prices are very low in Romania making pig feed costs the lowest of all regions. The soybean meal price is the highest of all regions, increasing poultry feed costs considerable.
2. Only Lopro soybean meal was available. Hipro soybean meal has a value of € 10.47-13.83 over that of Lopro in poultry feeds.
3. The added value of high(er) quality soybean meal is high in all feeds because DDGS products increase the value of Hipro soybean meal and fats & oils are

relative expensive. In layer feeds the usage of soybean meal is highest.

4. The highest added value of high(er) quality soybean meal is obtained in broiler feeds. The latter is (still) highest of all regions.
5. Soybean meal from the U.S. is € 2.36 worth more than Argentinean soybean meal in swine grower feeds, € 3.04 in layer feeds and € 3.95 in broiler feeds.
6. Soybean meal from the U.S. is € 1.72/100 kg worth more than Brazilian soybean meal in swine grower feeds, € 1.00 in layer feeds and € 1.01 in broiler feeds.

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In conclusion in all regions, soybean meal from the U.S. has a higher value than soybean meal from Argentina or Brazil. Hipro soybean meal from the U.S. has the highest added value, specifically in broiler feeds. These value differences are a result of differences in the protein content as well as differences in the digestibility of amino acids and organic matter (energy content). Usage rate of soybean meal is higher in poultry feeds than swine feeds.

4. Analyses of value differences (€/100 kg) of soybean meal of differing qualities

As can be seen from the matrices (see table 1 Appendix) the different quality soybean meals differ in nutritional value resulting in shadow prices differences in feeds for different species and categories or phases, the main differences are:

1. Protein content. This varies from 46.0% (Arg.) to 46.9% (Brazil).
2. Energy content. U.S. soybean meal has a 2.6% higher NE (swine), 3.0% higher AME-layer and 3.6% higher AME-broiler than soybean meal from Argentina. Brazilian soybean meal is 2.1% higher in NE, 2.1% AME-layer and 2.1% AME-broiler than soybean meal from Argentina.
3. Amino acid profile, amino acid digestibility and digestible phosphorus. U.S. soybean meal has f.i. a 7.9% higher AID lysine (swine) content than soybean meal from Argentina and the TD lysine (poultry) content is 9.2% higher. Brazilian soybean meal has a 2.5% higher AID lysine (swine) content than soybean meal from Argentina and the TD lysine (poultry) content is 2.9% higher.

The value difference caused by each factor is given in table below where a comparison is made to Brazilian soybean meal for each species. This analysis is based on the shadow prices in the Netherlands (Hipro soybean meal € 42.40) for February-April of the different qualities soybean meal (see table 1 chapter 3). The results are in general applicable to all regions.

Table 10. Differences in value (€/100 kg) of the different soybean meals caused by the chemical and nutrient differences compared to the Brazilian and Argentinean product

	Swine			Layer			Broiler		
	Argent. vs Brazil	U.S. vs Brazil	U.S. vs Arg.	Argent. vs Brazil	U.S. vs Brazil	U.S. vs Arg.	Argent. vs Brazil	U.S. vs Brazil	U.S. vs Arg.
<i>Absolute differences in nutrient value</i>									
Protein%	-0.9	-0.7	+0.2	-0.9	-0.7	+0.2	-0.9	-0.7	+0.2
Energy cal	-40	+10	+50	-48	+20	+68	-39	+30	+69
<i>Value (€/100 kg) differences (compare to table 1)</i>									
Protein €	-0.54	-0.45	+0.12	-0.72	-0.56	+0.16	-1.01	-0.79	+0.22
Energy €	-0.37	+0.09	+0.46	-0.37	+0.15	+0.52	-0.80	+0.62	+1.43
Dig. AA €	+0.22	+2.00	+1.75	+0.26	+0.56	+0.30	+0.40	+0.82	+0.41
Total €	-0.69	+1.64	+2.33	-0.83	+0.15	+0.98	-1.41	+0.65	+2.06

A difference of 0.9% crude protein with the still high soybean meal prices adds or decreases € 0.54 /100 kg to the value of Hipro soybean meal in swine feeds (was € 0.54 in week 48), € 0.72 in layer feeds (was € 0.81) and € 1.01 in broiler feeds (was € 0.94). The value of protein in soybean meal protein decreased in layer feeds due to the decrease in the Hipro soybean meal price (- € 0.60) as well as grains and other protein sources compared to week 2 but increased in broiler feeds due to the higher usage of maize DDGS..

The lower rye, triticale and wheat and fats & oil prices together with the lower Hipro

soybean meal, maize DDGS and rapeseed expellers price but higher maize price have chanced the value of soybean meal due to energy content as follows: 50 kcal NE adds € 0.46/100 kg to the value of Hipro soybean meal in swine feeds (was € 0.55), 68 kcal ME € 0.52 in layer feeds (was € 0.75) and 69 kcal € 1.43 (was € 1.18) in broiler feeds. The relative high costs of toasted soybeans and high usage of maize DDGS increased the energy costs significantly in broiler feeds.

Consequently the value differences due to protein content are larger in poultry than swine feeds but largest in broiler feeds. Differences in the amino acid pattern and digestibility (along with the digestible phosphorus content) create an added value of € 1.75-2.00/100 kg in swine feeds for U.S. soybean meal over that from Argentina or Brazil, € 0.30-0.56 in layer feeds and € 0.41-0.82 in broiler feeds. These value differences are largest in swine feeds. In conclusion next to the protein content, the digestible energy, amino acid and phosphorus contribute significantly to the value of soybean meal.

From table 10 above can further be concluded:

1. Differences in the protein content contribute significantly to the differences in the value (shadow price) of soybean meal. However this explains only partly the differences in the value.
2. The value (shadow price) differences due to energy are largest in broiler feeds. The U.S. origin demands a higher value of € 0.46 over Argentinean soybean meal due to a 50 kcal ME difference in swine feeds, a € 0.52 difference in layer feeds for a 68 kcal ME difference and a € 1.43/100kg for a 69 kcal ME difference in broiler feeds.
3. The increased digestibility of amino acids (and phosphorus) has a large impact on the added value of U.S. soybean meal for swine feeds, compared to the Brazilian origin it adds € 2.00.

Variation in nutrient values

The effect of variation in the nutrient value (4-5%) of soybean meal on the value (market price € 42.40/100 kg in the Netherlands for February-April) is given in the following table.

Table 11. Price effect of variation in nutrient value

	Swine	Layer	Broiler
+/- 100 cal	0.92	0.76	2.07
+/- 4% dig AA	1.12	0.14	0.12
+/- 100 Cal and 4% dig AA	2.04	0.90	2.19
+/- 0.1 g/kg dig P	0.00	0.03	0.04

Variation in the energy content has the largest effect on the value of soybean meal in broiler feeds. A variation of +/- 100 cal has a € 0.92/100 kg effect on the Hipro soybean meal value in swine and € 0.76 in layer feeds while this is € 2.07 in broiler feeds.

Variation in the AID (or SID) amino acid content has the largest impact in swine feeds. A variation of 4% in digestible amino acids increases the value of Hipro soybean meal with € 1.12 in swine, but only € 0.12 in broiler and € 0.14 in layer feeds. The effects of energy and digestible amino acids on the value of soybean meal are additive. Digestible phosphorus has the highest value in poultry feeds.

In summary the higher economical and nutritional value of soybean meal from U.S. origin over soybean meal from Argentina or Brazil, at the same protein content, is caused by the (combined) higher amino acids and organic matter (= energy) digestibility. Differences in the (digestible) energy content contribute more to the added value than differences in digestible amino acid and phosphorus content.

Sincerely yours,

Jannes Doppenberg, Ph.D.

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Appendix

Least cost formulations set up

The purpose of least cost formulations is to determine the shadow price of feedstuffs like Hipro soybean meal of different qualities (origins) in comparison to other (protein rich) feedstuffs. The *shadow price is the maximum price* that can be paid for a feedstuff to be used in a feed formulation, this is dependant on:

- Market effects. Mainly the availability and prices of ‘competing’ feedstuffs, i.e. protein rich feedstuffs like other quality soybean meals, sunflower seed meal and/or rapeseed meal. Therefore current market and future prices of feedstuffs for the Dutch, Spanish, Polish, Romanian and Maghreb feed industry when available are used. Updates are made on a monthly base, so that the effects of feedstuff price changes on feedstuff composition and compound feed costs can be analyzed.
- The species for which the feed is formulated, since the feeding or nutritional value of the feedstuff and/or the nutrient restriction vary per specie. Therefore three sets of feed formulations are made for swine, layers and broilers each.
- The chemical composition and matrix values of soybean meal (of different origin). The price effect of differences in a) protein, b) energy and c) digestible amino acid (and phosphorus) were analyzed separately by equalizing protein and energy contents for swine and poultry feeds. Both the chemical composition of SBM as well as the effect of processing (crushing) varies and influences the nutritional quality. The nutrient values listed in table 1 are averages based on the research of Prof Mateos, individual batches of SBM can vary considerable.

Note that the exact nutritional and economical value of a feedstuff can only be obtained (and compared) if the feeding value (Net Energy or Apparent Metabolizable Energy content and digestible ileal or total tract amino acid content) was determined with the target species (layer, growing pigs or broiler) of all feedstuffs used in the formulation via the same research protocol (for the digestibility experiments). In this formulation the CVB matrix is used for all the feedstuffs and the three different (origins of) soybean meals are compared among each other with matrix values obtained from the research of Prof. G. Mateos (Universidad Politecnica de Madrid, Spain). Therefore the differences in economical value among the three soybean meals with different origins can be determined from the differences in nutritional value from the different matrices.

Matrix values

The most important nutrient values per species of the different soybean meals are listed in table 1. Note that the nutrients which have a minimum or a maximum restriction or requirement in the formulations influence both the feed cost and shadow prices of feedstuffs. The energy (NE, EV and AME) and the (ileal) digestible amino acids content are most crucial.

Table 1. Nutrient values per specie of the soybean meals by origin

Chemical composition (g/kg product)				
Feedstuffs	CVB		Mateos Matrix	
	SFR	Argentina 46.0% CP	Brazil 46.9% CP	U.S. 46.2% CP
Chemical analyses				
Moisture	122.0	120.0	112.0	120.0
C.Protein	468.0	460.0	469.0	462.0
C.Fiber	40.0	36.0	54.0	38.0
Ash	64.0	67.0	62.0	67.0
C.Fat	22.0	16.0	19.0	15.0
Starch (Ewers)	40.0	25.0	25.0	25.0
Sugars	65.0	67.0	53.0	79.0
Calcium	2.80	3.30	3.00	4.60
Phosphorus	6.30	6.90	6.20	6.80
Potassium	22.3	22.5	21.3	21.1
Lysine	29.0	28.3	28.6	28.8
Meth+cyst	13.6	13.5	13.4	13.5
Tryptophan	6.1	6.3	6.3	6.4
Threonine	18.3	18.2	18.2	18.1
Isoleucine	21.5	20.8	21.2	20.8
Energy value				
NE pigs kcal	1945	1940	1980	1990
EV pigs (Dutch)	92.62	92.38	94.29	94.76
AME layer kcal	2227	2242	2290	2310
AME broiler kcal	1888	1901	1940	1970
Digestible nutrients				
Digestible P swine	2.50	2.70	2.40	2.70
Dig. P poultry	2.60	2.80	2.30	2.80
il.dig.Lys swine	25.8	24.0	24.6	25.9
Il.dig.Lys/100 g.Pr	5.51	5.22	5.25	5.61
il.dig.Meth swine	5.9	5.5	5.4	5.8
il.dig.M+C swine	11.6	10.9	11.1	11.6
il.dig.Tryp swine	5.2	5.2	5.2	5.5
il.dig.Thre swine	15.4	14.5	14.7	15.4
il.dig. Isol swine	18.7	17.5	18.1	18.5
dig.Lys poultry	25.5	24.0	24.7	26.2
dig.Lys/100 g.Prot	5.45	5.22	5.27	5.67
dig.Meth poultry	5.8	5.5	5.5	5.8
dig.M+C poultry	11.5	11.1	11.2	11.9
dig.Tryp poultry	5.4	5.4	5.4	5.5
dig.Thre poultry	15.6	14.9	15.2	15.9
dig.Isol poultry	18.9	18.1	18.7	18.8

Table 2A Feedstuff prices in €/100 kg week 5, the Netherlands

Period		Febr.-Apr.	May-July
Code	Feedstuff		
00010	Citruspulp Braz./USA	19.50	20.20
00013	Peas <22%CP	26.00	26.00
00015	Barley (EU)	18.80	18.50
00023	Hipro SBM bypass pel	44.00	39.00
00026	Soybean hulls	18.60	18.00
00033	MOLASSES cane <47% _s	17.40	17.50
00034	Flaxseed	50.50	50.50
00038	Alfalfa 15% CP	24.70	23.70
00040	RSM.expell <12%fat	NA	NA
00044	Rapeseed Expellers 8%	26.00	26.00
00061	Rye (EU)	18.10	18.10
00063	WHEAT EU (feed)	20.00	20.00
00064	PALMKERNELml<20%fiber	18.20	18.00
00075	Beet Pulp 20-25% _{sugar}	24.10	24.50
00076	MAIZE (EU)	18.80	18.80
00077	SBM 42%CP Arg.pel.	NA	NA
00078	L-lysine HCl	116.00	116.00
00079	DL-Methionine	275.00	275.00
00080	Soybeans toast.pel.	44.80	42.20
00081	SBM 44/7 domestic	39.60	36.10
00084	SBM Hipro domestic	42.40	38.60
00090	Wheat middlings	16.10	16.00
00096	Soy oil liq.	70.00	69.00
00097	Palm oil	65.80	65.80
00099	Poultry Fat	62.50	NA
00100	Animal fat (lard)	58.50	NA
00105	Fish meal S. America	113.50	113.50
00107	MAIZEglut. fd ml 20-23%CP	20.00	19.10
00113	Sunflowerseed<29%CP	19.30	18.80
00165	TRITICALE	19.20	19.20
00191	TAPIOCA 65% starch	NA	NA
00214	L-Threonine	165.00	165.00
00228	Monocal Phosph	50.40	50.40
00256	Fatty Acids 20% Lin.	65.50	66.50
00258	Palm oil Fatty Acids	60.50	60.50
00265	RSM bypass Rumirap	28.00	25.50
00266	Rapeseed meal34%CP	26.00	24.00
00284	RSM bypass Mervob meal	28.00	25.50
00302	CovaSoy HP	44.00	39.00
00332	Vinasses beet	11.00	11.00
00488	MAIZE distillers sol	23.00	23.00
00489	WHEAT DDGS	NA	NA
02019	DCP-P Sonac	NA	NA
02063	WHEAT+enzyme	21.20	21.20

N.A. = Price Not Available

Table 2B. Feedstuff prices of week 5 for Spain*, Romania# and Poland compared to the Netherlands

* Feedstuff prices for the Northern Barcelona area.

#Feedstuff prices are similar for Romania, Bulgaria, Serbia and Macedonia, see text for exceptions

	Spain	Romania#	Poland	Netherlands
	€/100 kg	€ /100 kg	€/100 kg	€/100 kg
Code	Description			
00013		21.75		26.00
00015	18.40	18.00	19.50	18.80
00061	18.30			18.10
00026	16.90	7.85		18.60
00033	16.00	12.55	14.30	17.40
00038	17.00			24.70
00044				26.00
00061	19.50	13.70		
00063	21.70	15.90	19.30	20.00
00075	22.50	21.30	16.90	24.10
00076	18.15	14.80	16.20	18.80
00078		124.45	134.75	116.00
00079		270.30	269.75	275.00
00080		52.30		44.80
00084	44.90	45.35[^]	43.60	42.40
00090	17.50	10.70	13.35	16.10
00096	66.50	69.20	72.60	70.00
00097	68.00			65.80
00100	71.00		67.85	58.50
00105	88.00			113.50
00107				20.00
00113	21.40			19.30
00165		13.90	16.65	19.20
00214		182.90	158.35	165.00
00228		58.30	48.95	50.40
00266	28.20	19.30	24.05	26.00
00488		13.45	21.65	23.00
00258	67.50			60.50

[^]Lopro quality * Hipro Sunflower seed meal in Romania and Spain; Lopro in the Netherlands.