The Importance of GM Soybeans to the Romanian Livestock Industry

Written with the support of the following food and agriculture associations and boards:

PRO AGRO, Agrobiotechrom, U.C.P.R., A.P.C.P.R., A.R.C.P.A., and A.N.F.N.C.

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Food and agriculture associations and boards would like to share their views and contribute to the ongoing discussions regarding the revision of the EU's decision-making process on the use of Genetically Modified Organisms (GMOs) in food and feed.

Thus, we believe that the EU's recent suggestion to change the import system for GM agricultural commodities by amending Regulation No 1829/2003 **should be rejected**, for the following reasons:

1. **The option of shifting the decision-making process to the level of Member States – which risks disturbing the EU's entire supply chain – must be avoided**, as it may lead to serious risks on the single market, causing an imbalance in the EU's supply with GM raw materials, which the EU is fundamentally dependent upon (given its imports of plant protein for feed production, which secure about 95 percent of its annual needs).

2. **It does not provide an efficient regulatory framework that would enable an effective operation of the EU's internal market.** The lack of uniformity among the criteria used by the various Member States will lead to a simultaneous licensing and banning of some products on the single European market, generating uncertainty and additional costs for the operators. Thus the agri-food sector is asking for a European GMO food & feed licensing system that would allow for a free and easy movement of food and feed evaluated as safe, everywhere on the EU's internal market.

3. **It allows the replacement of the current science-based licensing system** of GM ag commodities, used by the European Authority for Food Safety (EFSA), with arbitrary, political or ideological criteria. Any interference in the risk-evaluation process, other than scientific, should be avoided. Based on expert and independent views, EFSA needs to remain entirely responsible for the risk management activity and must set up efficient, rational, and science-based procedures.

4. **It affects the competitiveness of the EU – and Romanian – agri-food supply chains on the international market.** The EU policies must enable European food & feed operators to compete on an equal footing, in a world in which production efficiency rises and supply chains get globalised. In the medium and long term, farmers and producers in the EU need better access to key modern technologies, in order to improve their yields. If some of the Member States were to prohibit GMO imports, one should expect **a price rise of non-GM soybeans** (as an incentive to increase production of this crop) over the medium and long term and this will directly impact livestock production costs, namely, the end user prices. **This trend will be all the more pronounced, as protein demand in non-anti-GMO third countries (such as China, Mexico, Japan, Indonesia, and Turkey) is going up. This in turn will drive major soybean-growing states, to which the EU is not a major importer, not to change their technology in the medium term.**

As to Romania, the suggested changes to the EU legislation on GM ag commodity imports and processing may massively affect its feed and livestock growers, because of the supply and demand distortions that will be generated as a result.

After 19 years of cultivation, GM plants have come to be grown on 181 million hectares, in 28 countries worldwide, among which the United States, Brazil, and Argentina.

In the European Union, soybeans cover only 5 percent of use and are grown either as a conventional, or as an organic, crop. Transgenic soybeans are not allowed for cultivation in the EU. Therefore, in order to secure its supply, the EU imports 33-35 million tons of soybeans and meal every year, mostly from Brazil, Argentina, and the United States. Imports are largely made up of GM soybeans, since 88 percent of the world's production of soy is based on that technology.

The livestock industry in our country, much as the European one, is largely dependent upon plant protein from outside the EU.

Romania's soybean production is far from meeting its domestic feed use (the rate is 20-30 percent, as seen in Graph # 1 and Tables # 1-3); the country is therefore a net importer of soybean meal – a commodity that ranks consistently among the top items in its agricultural trade balance.

While Romania's dependency on soy imports dropped evidently during the time when transgenic soybeans were allowed for cultivation in this country, the area on which soybeans may be grown here currently is naturally limited, because of the local crop rotations and lack of irrigations[1].

Despite the fact that many other available sources of protein exist for livestock feeding, the use of soy in pork and poultry production is the main driving force in the sector's international trade. While for beef and milk, soybeans may be replaced with other protein sources more easily, in the case of poultry and pork, the replacement is much less flexible, as soybeans are one of the most valuable sources of protein and oil.

A number of characteristics make soy a key product in mixed feed compounding: high protein content (44 percent of digestible proteins), low cellulose (6 percent), balanced amino acid content, high lysine, and low anti-nutritional components. Lastly, soybeans are easily processed as a pelleted product and are fiber-poor.

A great advantage to the livestock industry is its relatively low price, given its protein content.

[1]Yields in experimental plots at *ICITID Băneasa Giurgiu* had reasonable values (going from 2,6 to 4 tons per hectare), only in irrigated systems, while in non-irrigated systems, yields varied between 1,2 and 2,5 tons per hectare (Hălmăjan, 2015).

Since the EU law does not allow livestock and poultry operators to feed animal protein, meal is the only alternative to secure protein in formulations, and nutritionally speaking, the most accessible one is soybean meal (or full-fat soy), especially on broiler farms.

Data provided by the UCPR[2] (Tables 4-5) indicates the amount of soybeans needed by broilers and other bird categories in Romania in 2010-2015 and the outlook for the country's 2020-2030 national programme. The poultry industry's current soybean use stands at about 390 thousand tons. **To achieve the higher envisaged levels of poultry meat in 2020-2030, feed use will reach as much as 500 thousand tons.**

The other categories of livestock in Romania (particularly swine) are largely estimated to require an even higher amount of soybeans than birds, driving the national total demand to 800 thousand tons for the current period and to over 1 million tons during the next period.

Tables 7 and 8 herein make a feed cost comparison between broilers and swine raised in industrial operations in 2014. Data provided by the UCPR, APCPR[3], and ANFNC[4] indicate that if it were to substitute GM soybeans (currently used in formulations) with conventional soy, the poultry sector would have to spend an additional EUR17 million every year, for broilers alone, while swine producers would have to pay an additional EUR28 million. This would inevitably trigger retail prices rises, while Romania's average food use per capita has been 85 percent of the European average in recent years.

In 2013, the EU's meat use per capita reached its lowest in the previous 11 years (64,7 kilos), while in Romania, it stood at 54,4 kg, after having gradually risen to a peak of 67,3 kilos, in 2009. According to the FAO, the 2013 meat use consisted mainly of pork (53 percent) and poultry (32 percent).

Romania's self-reliance was greater for poultry (94 percent) and still low, for pork (72 percent), in 2012. Pork from domestic production is mainly used as fresh meat, where prices are higher, while imported refrigerated pork is used in the sausage & meat product industry.

Although the FAOSTAT puts Romania's daily amount of animal protein (grams/day/person) at 106 g/day/person compared to the world average of 79 g/day, differences exist, nonetheless, in terms of protein quality. Thus in France, 62-64 percent of the daily available protein amount per person is of animal origin, while in Romania, animal protein sources account for only 44-48 percent.

According to the *Global Food Safety Information*, almost 50 percent of a household's total costs are spent on food, in Romania. This shows the food security vulnerability of Romanian households, which is even greater in the urban area (many rural homes still relying on their own production).

The Appendix herein presents a study case about an industrial swine farm in western Romania. The operation has a total number of 9142 head, of which 700 sows. The raising process takes place in three stages: 1) sow raising; 2) growing - bringing pigs from 9 to 70 kg, and 3) finishing

[2] The Romanian Association of Poultry Growers
[3] The Romanian Association of Pork Growers
[4] The Romanian National Association of Mixed Feed Compounders

(70-110 kg). Stages 1 and 2 are the most expensive, as animals need to be fed on high-protein, high-quality ingredients. If soybeans were taken off the daily rations of pigs in stages 1 and 2, the price of procuring one ton of feed would increase by Lei409,5 (for sows) and by Lei171,18 (for growing stage pigs), and the finishing would take at least 3 months longer. Also, carcass quality would be lower. Another factor that makes replacing soybean protein with fish meal inefficient will be the rising prices of the latter, as well as its limited supply.

Such being the circumstances, we appreciate that EU's envisaged change of GM commodity import legislation to allow Member States to prohibit them on non-scientific grounds presents a major risk of disrupting ag raw material supply chains, with the following likely consequences for our country:

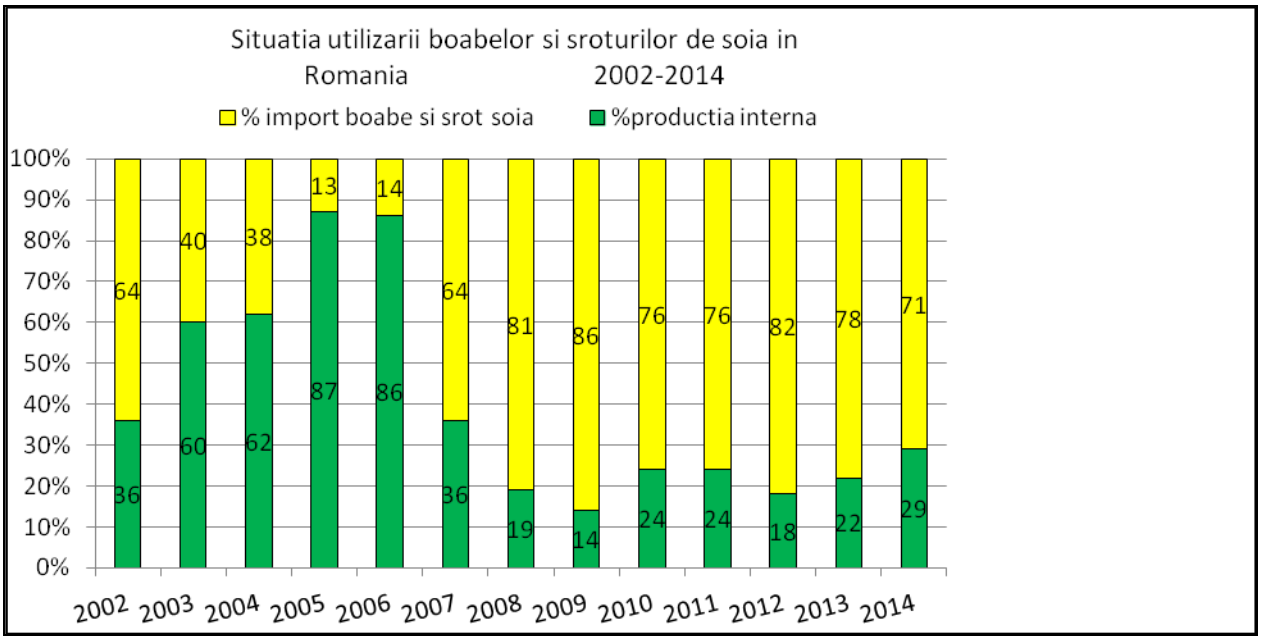
- rising prices of ag raw materials, especially of non-GM soybeans, because of the need to stimulate the crop's production; this would have a direct impact on livestock production costs;
- delocalising meat production to states that do not promote such policies;
- a drastic fall of livestock numbers, especially in the poultry and swine industries;
- additional imports of meat and meat products (most likely produced based on GM products);
- meat price increases;
- meat use decline, as households in Romania are highly vulnerable in terms of food security, especially in the urban areas;
- lay-offs in the feed, livestock, and food processing industries, triggering additional social insurance costs to the state budget;
- driving local populations to emigrate to other European countries;
- continued exports of low value-added ag commodities (such as grains).

APPENDICES

Graph 1: Soy protein use in Romania, by sources

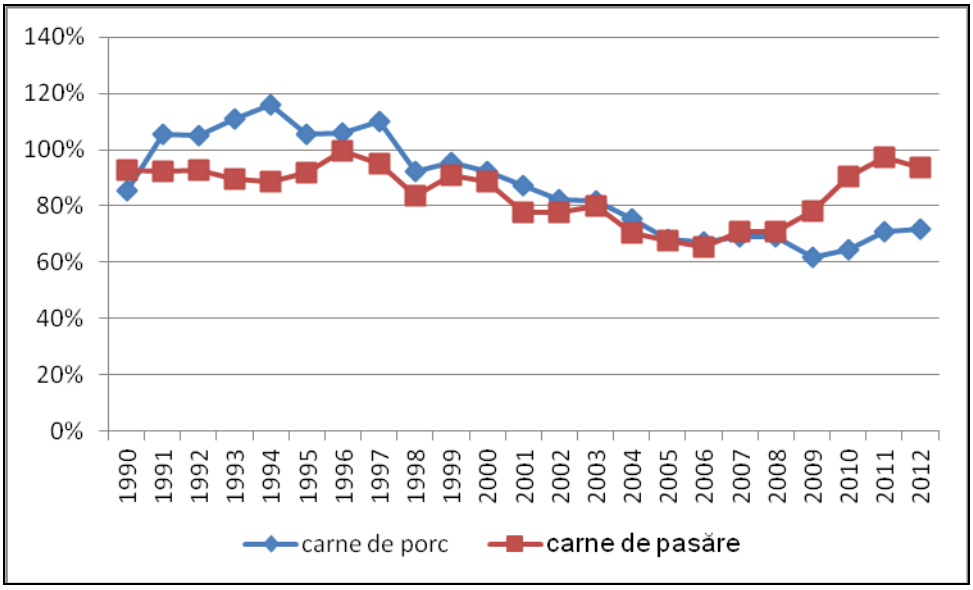
Soya bean and meal use in Romania, 2002-2014

- Soya bean and meal imports (percentage)
- Domestic production (percentage)



Source: Eurostat. Soybean/meal conversion coefficient: 0,75

Graph 2: Romania's self-reliance in pork and poultry



Source: FAOSTAT

- Pork
- Poultry

Table 1: Romania's soy trade balance (bean equivalent), 2002-2014 (tons)

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Domestic soybean production[1]	145932	224908	298506	312781	344909	136094	90579	84268	149940	142636	104330	149931	202960
Soybean imports[2]	141705	54389	45134	1169	11949	68600	93403	21873	17167	34392	63322	117276	102651
Soybean exports[2]	7651	24785	13163	49780	54218	23504	27183	11551	37660	74040	89511	38982	40087
Soybean meal imports, bean equivalent[3]	143546	132257	157477	117516	108736	289396	424215	625596	580311	607131	642081	618309	609556
Soybean meal exports, bean equivalent[3]	13595	13116	9796	22007	8913	87929	113755	137791	95785	107577	139985	156077	184676
Disappearance[4]	**409937**	**373653**	**478158**	**359679**	**402463**	**382657**	**467259**	**582395**	**613972**	**602541**	**580237**	**690457**	**690404**
of which:													
domestic production %	**36%**	**60%**	**62%**	**87%**	**86%**	**36%**	**19%**	**14%**	**24%**	**24%**	**18%**	**22%**	**29%**
bean imports %	**35%**	**15%**	**9%**	**0%**	**3%**	**18%**	**20%**	**4%**	**3%**	**6%**	**11%**	**17%**	**15%**
meal imports %, bean equivalent	**30%**	**25%**	**28%**	**13%**	**11%**	**47%**	**61%**	**82%**	**73%**	**71%**	**71%**	**61%**	**56%**

Source: [1]- INS[5]; [2] – Eurostat; [3] – Eurostat data + conversion coefficient (0,75 tons of meal = 1 ton of soybeans); [4] domestic production + bean imports + meal imports (bean equiv.) – bean exports – meal exports (bean equiv.)

Table 2: Romania's imports of soy beans and meal (soy area equivalent/hectares)

Item :	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Soy meal imports	152886	70365	83782	62522	57851	153967	225694	332835	308742	323011	341605	328958	324301
Soybean imports	75391	28936	24013	622	6357	36497	49693	11637	9133	18298	33689	62394	54613
Total imports	**228277**	**99301**	**107795**	**63144**	**64208**	**190464**	**275387**	**344472**	**317875**	**341308**	**375294**	**391352**	**378914**
Soy meal exports	5425	5234	3909	8781	3557	35086	45391	54981	38220	42926	55857	62278	73690
Soybean exports	4071	13186	7003	26484	28845	12505	14462	6145	20036	39391	47622	20740	21327
Total exports	**9495**	**18420**	**10912**	**35265**	**32402**	**47590**	**59853**	**61127**	**58257**	**82317**	**103479**	**83018**	**95017**

Source: Our own calculations, based on Eurostat data, using the 0,75 % bean-to-meal conversion coefficient and Romania's Olympic average yield in recent years.

[5] Romanian National Statistics Institute

Table 3: Romania's soy bean & meal trade balance

Trade surplus/deficit in:	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
- soybeans	-27981	-9103	-4052	9490	1573	-14737	-34503	5417	22327	28834	-7827	-32313	-34238
- soy meal	-22979	-19159	-24268	-18516	-656	-24712	-73434	-120572	-107616	-98740	-133292	-142253	-185639
	-50961	-28262	-28320	-9026	916	-39448	-107937	-115155	-85289	-69906	-141118	-174566	-219878

Source: Eurostat

Table 4: Soy consumption by main user (broiler sector)

Year	Daily gain (tho t)	Feed conversion (kg per kg of gain)	Total mixed feed use (tho t)	Soy meal in formulations (30 %)	Bean equivalent (75 %)
2010	324,1	1,9	615,8	184,7	246,2
2011	348,5	1,9	662,1	198,6	264,8
2012	380,7	1,9	723,3	216,9	289,2
2013	409,5	1,8	739,1	221,7	295,6
2014	426,8	1,8	768,2	230,5	307,3
2015 (projected)	435	1,8	783	235	313,3
2020-2030 (planned)	710 (554 - carcass)	1,75	1242,5	372,7	496,9

Source: UCPR

Table 5: Soy consumption by other poultry categories, 2014

Category	Production	Feed conversion	Total feed use (tho t)	Of which soy meal (tho t)	Soybean equivalent
Laying hens	1,44 million eggs	157,9 g	198,0	30,0	40,0
Replacement stock	10 million eggs	10 g	100,0	10,0	20,0
Heavy breed reproduction	180 million eggs	150 g	45,0	7,0	10,0
Breeding youth, heavy breeds	1,5 million eggs	12	18,0	4,0	6,0
Other categories	X	x	20,0	4,0	6,0
Total	X	x	381	60	82

Source: UCPR

Table 6: Romania's meat consumption (kg/capita), 2002-2013

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fresh meat	51,0	56,7	61,6	64,2	65,9	64,7	66,0	67,3	59,9	56,0	55,3	54,4
Pork	21,7	24,6	28,7	29,6	32,1	32,4	34,6	34,3	33,3	30,5	29,6	29,1
% of total	43%	43%	47%	46%	49%	50%	52%	51%	56%	54%	54%	53%
Poultry	18,9	20,2	20,1	21,5	21,8	20,7	20,1	22,7	18,2	17,5	18,2	17,5
% of total	37%	36%	33%	33%	33%	32%	30%	34%	30%	31%	33%	32%

Source: FAOSTAT

Table 7. Industrially-produced BROILER prices, 2014

Type of feed	1 ton of feed (EUR)
GMO soy-fed broiler	298,49
Non-GMO soy-fed broiler	314,39
Difference (EUR/ton)	15,9

For every kilo of gain, a young broiler chicken needs to eat 1,763 kilos of feed.

Average weight of a bird (kg)	2,1
Amount of feed eaten by a bird in order to reach 2,1 kg (breeding included)	5,25
Industrial broiler numbers, 2014 (head)	204 000 000
Total consumption of mixed feed (kg)	1 071 000 000
Total consumption of mixed feed (tons)	1 071 000
Global additional cost for the industrial sector, 2014 (EUR)	**17 028 900**

* Data by the UCPR and the ANFNC

Table 8. Industrially-produced PORK prices, 2014*

	Lei	EUR
Additional cost of raising 1 sow	**89,0**	**20,2**
Additional cost per raising stage No 1 (9-30 kg)	5,7	1,3
Additional cost per raising stage No 2 (30-70 kg)	17,0	3,9
Additional cost per feeding & finishing stage (up to 100 kg)	6,6	1,5
Total additional cost for all raising stages	**29,3**	**6,7**

*Study case information

	Relevant figures
Sow numbers in Romania, 2014 (head)*	119 000
Total additional cost, sows: 88,97/sow (Lei)	10 587 430
Total additional cost, sows (EUR)	**2 406 234**

Swine numbers in Romania, 2014 (head)*	3 850 000
Total additional cost, swine: 29,3/hog (Lei)	112 805 000
Total additional cost, swine (EUR)	**25 637 250**

*Data by the APCPR

Exchange rate: EUR1= Lei4,4

Study Case Appendix

Swine Farm in Western Romania, totalling 9142 head, of which 700 sows (January 2015)

As of January 2015, the farm had 700 sows, while the total numbers of swine included 1082 sucklings, 3500 young, and 4560 finished pigs. Under the processing programme, 380 head of 110-kilo finished pigs are delivered to the slaughterhouse every week.

1. SOWS

Every sow must be fed very well during lactation (6 to 7 kilos of feed per day, for 31 days). Every sow farrows and raises 11 young pigs.

Lactating sows fed on GM soy

Ingredient	Percentage used
Maize	44.824
Soybean meal	19.032
Wheat bran	14.384
Wheat	10
Soybean oil	3.873
Sunflower meal	3.5
Calcium carbonate	1.705
MCP	1.346
Salt	0.599
Px DSM for lactating sows	0.5
Lysine	0.106
Ronozyme VP	0.02
Methionine	0.012
Total	100%

Cost per 10 tons of feed (Lei): 9797,75

Lactating sows fed on non-GM soy

Ingredient	Percentage used
Barley	23.231
Wheat	20.808
Maize	19.972
Wheat bran	15
Skagen fish meal	9.982
Soybean oil	5
Sunflower meal	3.5
Calcium carbonate	1.457
Px DSM for lactating sows	0.5
MCP	0.232
Salt	0.192
Lysine	0.086
Threonine	0.02
Ronozyme VP	0.02
Total	100%

Cost per 10 tons of feed (Lei): 13893,27

Price difference per 1 ton of feed: Lei 409,5

- additional cost per sow, if GM soy is no longer administered:
31 days *7kg/day *Lei 0,41 = Lei 88,97/sow
- additional cost to be found in the final cost of the finished pig:
Lei 88,97/11 young pigs = Lei 8 897/pig

2. GROWING STAGE

This stage includes pigs weighing between 9 and 30 kilos (in a first stage) and pigs between 30 and 70 kilos.

During the first stage, each pig is administered 1,6 kilos of feed for each kilo of meat and must gain 21 kilos. The animal may not be given high-cellulose feed at this time, because:

- its digestive system is not developed enough to eliminate fiber;
- cellulose may cause major problems to the intestinal tract.

During the second stage, each pig receives 2,5 kilos of feed for each kilo of meat and must gain 40 kilos.

Pigs at growing stage, 30-70 kg

Pigs at growing stage, 9-30 kg

On GM soy

Ingredient	Percentage used
Maize	38.581
Wheat	20
Barley	14.608
Sunflower meal	9.5
Soy meal	7.05
Wheat bran	7
Calcium carbonate	1.198
Salt	0.52
Px DSM	0.5
MCP	0.489
Lysine	0.381
Threonine	0.138
Tryptophan	0.023
Methionine	0.01
Total	100%
Cost per 10 tons of feed (Lei)	7778,9

Not on GM soy

Ingredient	Percentage used
Maize	41.748
Wheat	20
Barley	15
Sunflower meal	9.5
Wheat bran	7
Skagen fish meal	4.2
Calcium carbonate	1.061
Px DSM	0.5
Lysine	0.376
Salt	0.351
Threonine	0.129
MCP	0.103
Tryptophan	0.031
Total	100%
Cost per 10 tons of feed (Lei)	9490,74

Price difference per 1 ton of feed: Lei 171,18

Additional cost per pig during 1st growing stage: 21 kg * 1,6 * Lei 0,17 = Lei 5,71

Additional cost per pig during 2nd growing stage: 40 kg * 2,5 kg * Lei 0,17 = Lei 17

3. FINISHING STAGE

At this stage, each pig receives 2,5 kilos of feed for each kilo of meat. During this period, the pig must gain 40 kilos. The pig may also be fed higher-cellulose feedstuffs, even if they are lower in protein. Pigs have greater fiber digestibility capacity at this stage.

Pigs at finishing stage, 70 - 110 kg

On GM soy

Ingredient	Percentage used
Maize	42.045
Wheat	20
Barley	15.076
Sunflower meal	9.5
Wheat bran	7
Soy meal	3.172
Calcium carbonate	1.219
Px DSM	0.5
Salt	0.496
MCP	0.464
Lysine	0.38
Threonine	0.128
Tryptophan	0.02
Total	100%

Cost per 10 tons of feed (Lei) 7134,21

Not on GM soy

Ingredient	Percentage used
Maize	44.142
Barley	17.898
Wheat	16.359
Sunflower meal	9.5
Wheat bran	7
Skagen fish meal	2
Calcium carbonate	1.411
Px DSM	0.5
Salt	0.413
Lysine	0.349
MCP	0.284
Threonine	0.12
Tryptophan	0.023
Total	100%

Cost per 10 tons of feed (Lei) 7939,34

The price difference per 1 ton of feed is Lei 80,51.
Additional cost per pig: 40 kg * 2,5 * 0,08 = Lei 8