Danish Research Centre for
Organic Food and Farming

Progress Report 2007 and Application for Continuation in 2008

for research funding under the research programme:

Research in Organic Food and Farming
International Research Co-operation and Organic Integrity
(DARCOF III 2005-2010)

Funded by the Ministry of Food, Agriculture and Fisheries
under the Finance and Appropriation Act, Sections 24.33.02.10

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1. Project title and acronym:

Quality and Integrity of Organic Eggs, Chicken Meat and Pork (QEMP)

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2. Project journal number:

3304-FOJO-05-36-01

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3. Project period (month, year):

Start of project: 1/1-2007
End of project: 31/12-2009

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7. Midterm description of the project, its results and progress, and application for continuation in 2008

A. Project summary

Table A.1: Work package list (from application)

WP No.	WP title	Responsible scientist	Budget DKK	Start	End	Deliverable No.
1	Coordination and stakeholder contact	John Hermansen	200.000	01.01.07	31.12.09	D1.1-D1.2
2	Improvement of organic eggs	Marianne Hammershøj	3.050.000	01.01.07	31.12.09	D2.1-D2.11
3	Integrated chicken meat and apple production	John Hermansen	2.692.708	01.01.07	31.12.09	D3.1-D3.9
4	Strategies for a diversified organic pork production	Anne Grete Kongsted	3.107.900	01.01.07	31.12.09	D4.1-D4.11
5	Effect of FRF on intestinal pathogens in post-weaned pigs	Allan Roepstorff	1.521.656	01.01.07	31.12.07	D5.1-D5.4
6	Meat quality and food safety in organic production systems utilising FRF	Laurits Lydehøj Hansen	1.449.847	01.01.07	01.07.08	D6.1-D6.5
Total			12.022.111			

Objectives and expected achievements

The overall objective is to establish new methods of production of organic eggs, chicken meat and pork which support the health of the animals and which can form the basis for new high quality products differing in characteristics from conventional products. The specific objectives are to investigate:

- which feeding stuff and feeding strategies that may be used in order to obtain specific quality characteristics in eggs and pork as well as covering the nutritional needs of the livestock in a situation with 100% organic feed,
- how integrated chicken meat and fruit productions can be established with the aim to lower the risks of pests in apple plantations,
- which strategies for slaughtering age of pigs and chickens of different genotypes that can be introduced in order to obtain new high quality products as basis for convenience food,
- how an improved health of the intestine in piglets can be supported under free range condition through use of fructan rich feedstuffs and how this can influence the occurrence of parasite and zoonotic infections and post-weaning diarrhoea caused by *E. coli* and *L. intracellularis*,
- how final feeding – 1 and 2 weeks before slaughter - with fructan rich feedstuffs (dried chicory and lupine) decrease boar taint and improve sensory eating quality of both female and entire male pigs and influences *Campylobacter* populations.

These activities are expected to give the basis for proposing new production strategies for organic pig and poultry, which at the same time comply with the organic ideals of integrated production strategies and the consumers' expectations and demands to organic products.

Midterm results and progress

C.1 Description (summary) of main results and conclusions for each year

The project is a continuation of the forerunner. "PRE-QEMP" in which activities co-ordinated with present WP's 5 & 6 were carried out in 2006. This report includes what have been achieved until now for PRE-QEMP as well as QEMP activities.

Regarding WP's 1-4. This is the first year of the project starting 1/1 2007, and so the main activities here have been a successful beginning of the experimental activities.

WP1. Coordination and stakeholder contact
In June 2007 a meeting was held including project group members (17) and members from the established stake-holder group (7 persons). On the basis of presentations of the overall idea and the plans for the individual WP's the stakeholder group contributed with relevant contacts to be taken in relation to the production of diversified products. A project homepage was created afterwards (http://www.qemp.elr.dk/uk/)

WP2. Improvement of organic eggs
In WP2 the expesrimental facilities for organic egg production are under establishment at "Skovvang", where 48 houses with individual yards are being built. Two crops as protein rich sources have been grown at Jyndevad Forsøgsstation, and they will be included in the experimental diets for egg laying hens in the main experiment beginning spring 2008 and the subsequent short-term experiments. At the moment Quinoa has been harvested in September 2007 and soybeans are growing and harvesting is expected later in the autum. The roughage supplements for the experiments will be carrots and maize silage together as a treatment, and alfalfa silage alone as another treatment. The roughage crops are grown and alfalfa has been harvested and silage produced, whereas maize will be harvested and preserved later.

The two genotypes of egg laying hens for the main experiment in 2008 have been selected and in the beginning of December a total of 1350 day-old chicks of the breeds Lohmann Silver and New Hampshire are delivered from two Danish hatcheries to the experimental facilities at Foulum. The plan for rearing is ready, and from 4 days of age the pullets will be introduced slowly to roughage, which will increase during the rearing period. The plan is to distribute the two genotypes of hens into the outdoor facilities from beginning of April 2008.

The analytical methods for carotenoids in egg yolks by HPLC and for aroma compounds in yolk and albumen by GCMS are under establishment, and expected ready at the end of 2007.

WP3. Integrated chicken meat and apple production
In WP3 the planned experiment with different broiler genotypes reared in an apple plantation (Fejø research plantations) have been performed. The experiment included 280 New Hampshire broilers and 280 of the commercial hybrid JA757. Each of the two broiler types was divided into groups according to two different feed types (16% versus 19% protein). Now, the

broilers have been slaughtered (at two age-stages as planned, 82 days of age and 110 days of age). Carcasses have been transferred to University of Copenhagen for quality assessment during the next months. For these assessments only males were selected, since the New Hampshire females were too small at 82 days of age.

The preliminary growth results show that JA757 had a very fast growth rate resulting in gait problems for especially the males. Final live weights for JA757 were in average 4,350 g and 3,350 g for males and females, respectively, at 82 days of age, and 5,200 g versus 4,200 g at 110 days of age. Only at 110 days of age the feed type had a small influence on the live weight since the JA757 broilers were approximately 200 g heavier when they were fed 19% protein.

In contrast the New Hampshire breed was a very slow growing broiler and had no gait abnormalities. However, live weights at 82 days of age were only approximately 1,800 g for the males and 1,350 g for the females. At 110 days of age the corresponding live weights were 2,500 g and 1,750 g. Level of protein in the allocated feed only influenced the weight at 110 days of age, with the New Hampshire broilers being 50 g heavier when fed 19% protein.

Regarding the effects in the plantation, the density of sawflies was monitored in late May and apples (Discovery) have been harvested and the quality have been assessed. The results, however, have yet not been elaborated.

WP4. Strategies for a diversified organic pork production
In WP 4, the experimental activity has been established on a private farm. The experiment included 17 first parity sows (and not 18 as planned due to one sow dying shortly before farrowing): Six of a modern crossbred (Landrace x Large White) mated with a modern boar breed (Duroc), five of a traditional breed (Danish black-spotted) mated with Duroc, and finally six Danish black spotted sows mated with a Danish black-spotted boar. The sows farrowed outdoors in huts in April as planned. The piglets were weaned June-July and shortly after the first parity sows were slaughtered. Preliminary results indicate only a slightly lower litter performance for the traditional breed compared to the modern genotype (e.g. 8.2 versus 9.3 weaned piglets per sow) but a markedly lower live weight at slaughter (115 compared to 173 kg) of first parity sows. Shortly after farrowing two male pigs per litter were selected for non-castration. These male pigs (in total 33) were slaughtered in July at 40 kg live weight in average (30 kg slaughter weight). Simultaneously, three female pigs per litter were selected for different feeding strategies. The rest of the female pigs were housed indoors on deep-litter together with the castrated pigs. These pigs will be slaughtered at “normal” slaughter weight (100-110 kg) in October. The female pigs (in total 42) selected for different feeding strategies was divided litter-wise into high and low level of concentrate in August. Concurrently, they gained access to an area of lupine. Ultimo September they will gain access to an area of Chicory. The female pigs will be slaughtered in December at 140 kg live weight.

At present samples from the first parity sows and the male pigs have been transferred to DMRI for quality assessment. Meat colour and sensory profile of cuttings from the neck and the ham will be performed, among others.

WP5. Effect of FRF on intestinal pathogens in post-weaned pigs
In 2006, the pasture experiment with FRF feeding of sows and piglets was carried out and the samples were prepared and stored as planned (see progress report for PRE-QEMP).
The parasitological samples have been analysed in 2007, according to the plan, and the data

handling is still ongoing. The preliminary results show that parasitized piglets had a lower weight gain until weaning, when compared to the non-infected piglets. Post-weaning diarrhoea was most pronounced in groups infected with parasites, but overall no severe outbreak of diarrhoea was observed. Quite unexpectedly, pH in the intestinal contents tended to be higher in the chicory-groups than in the control-groups. Similarly, the concentration of short chain fatty acids was lowest in the chicory groups. No helminth eggs were found in faecal samples at any time, and practically no large worms were found in the piglets at slaughter, indicating that both experimental groups had eliminated the large worms before slaughter. The number of migrating *Ascaris* larvae was reduced when the piglets had got chicory, however the difference was not significant. *Trichuris* tended to be more numerous in the chicory group compared to control group (not significant). Overall, the parasite results were disappointing, as the worm numbers were generally low, which may reflect an unexpectedly high level of immune responsiveness (unexpected, when compared to previous observations in outdoor piglets). Due to this low infection level it is difficult to measure the effect of FRF on the helminth infections. The data sets are complex, and a need for allocating statistical expertise has been revealed. Solid statistical analyses are required before publishing the results.

Regarding the effect of FRF on post weaning diarrhoea, faeces samples were collected in 2006. Presently the samples are being analysed for *E. coli* by culture. The culturing and typing of *E. coli* will be finished within 2007. The preliminary results include high numbers of *Bacillus lincheniformis* in faeces from the FRF fed pigs. Importance of this observation is unknown.

Regarding effects of changes in *Campylobacter* populations, DNA has been extracted for the microbial community analyses, and the PCR reactions are mostly done. The Terminal restriction fragment analysis (T-RFLP) has been delayed because of implementation of a new instrument. This problem should now be solved and we expect in the near future to run these analyses. Because of the not clear clinical results of the FRF on the *E. coli* infection, we are establishing and analysing by Real-Time PCR the total number of Bacteria in the small intestine of the sampled pigs. Hopefully all these results will help to explain the clinical observations.

In 2006, the *Campylobacter* spp. excretion level in faeces was estimated for the pigs at 4, 7 and 9 weeks of age. In 2007, data has been analysed and the publication is in the preparation. The results showed that the *Campylobacter* excretion level decreased significantly in pigs that had been fed with chicory for two weeks (from 7 weeks of age) compared to a control diet. At 9 weeks of age, the *Campylobacter* excretion level had returned to a higher level similar to the level prior to inclusion of chicory in the diet.

WP6. Meat quality and food safety in organic production systems utilising FRF
The practical part of the experiment was completed ultimo 2006 according to the research plan. The *Campylobacter spp.* excretion level in faeces (from rectal, ileum, cecum, colon) was estimated after 1 or 2 weeks of feeding with the control, lupine or chicory diet. Furthermore, a sample bank of intestinal content and intestinal tissue (ileum, cecum and colon) from a total of 48 pigs was established. Data analysis and preparation of publication *(Campylobacter)* has been initiated. The molecular analysis (T-RFLP) of intestinal bacterial communities is ongoing. In addition, a new real-time PCR method for detection of *Bifidobacteria* has been implemented as a supplementary tool for evaluation of the intestinal bacterial communities.

Also, samples for assessing meat quality have been sampled according to plans. The results

shows, that including lupine or chicory in the diet for slaughter pigs reduce boar taint and improve the eating quality of pork meat even when fed for a limited period (1-2 weeks before slaughter) like in this experiment.

C.2 Fulfilment of deliverables and milestones

(To be completed for each work package)

Deliverables list (from application)

Workpackage 1						
Deliverable No	**Deliverable title**	**Lead scientist**	**Delivery date**	**Allocated scientific person moths**	**Type of deliverable**	**Fulfilled (ok) or deviations (d)***
D1.1	Mandatory yearly reporting to FOEJO	John Hermansen	10/2007	0.5	R	OK
D1.2	National conference	John Hermansen	12/2009	1	O	

** Deviations are to be further discussed in D*

Milestones list (from application)

Workpackage 1			
Milestone No	**Milestone title**	**Delivery date**	**Fulfilled (ok) or deviations (d)***
M1.1	Kick-off meeting including all participants accomplished	01/2007	OK
M1.2	Project co-ordination meetings	06/2007 04/2008 04/2009	OK
M1.3	Stakeholder meetings arranged	06/2007 04/2008	OK
M1.4	Synthesis work prepared for the national conference	08/2009	

** Deviations are to be further discussed in D*

Deliverables list (from application)

Workpackage 2						
Delive-rable No	**Deliverable title**	**Lead scien-tist**	**Delivery date**	**Allocated scientific person moths**	**Type of deliver-able**	**Fulfilled (ok) or de-viations (d)***
D 2.1	Newsletter on background for the project issues on organic egg production	Marianne Ham-mershøj	10/2007	0.5	O	Ok
D. 2.2	Newsletter on preliminary results of the main experiment of organic egg production	Sanna Steenfeldt	10/2008	0.5	O	
D 2.3	Presentation of organic egg quality and sen-sory evaluation at WPSA Poultry Congress	Marianne Ham-mershøj	08/2009	2	C	
D 2.4	Newsletter on organic egg production af-fected by forage material	Sanna Steenfeldt	06/2009	1	O	
D2.5	Paper on feed conversion, egg production & quality related to diets, genotypes & forage material	Marianne Hammer-shøj	12/2009	6	S	
D2.6	Paper on nutritional value of experimental diets	Sanna Steenfeldt	12/2009	5	S	
D2.7	Report giving recommendations for or-ganic egg production based on the project	Marianne Ham-mershøj	09/2009	3	R	
D2.8	Paper on choice feeding	Sanna Steenfeldt	12/2009	5	S	
D2.9	Paper on egg yolk colour related to caro-tenoids in different carrot varieties used as forage material	Marianne Hammer-shøj	12/2009	4	S	
D2.10	Newsletter on overall project results to increase the quality and integrity of organic eggs	Marianne Ham-mershøj	10/2009	1	O	
D2.11	Presentation at national conference on organic production of eggs, chicken meat and pork	Marianne Ham-mershøj	12/2009	2	C	

** Deviations are to be further discussed in D*

Milestones list (from application)

Workpackage 2			
Milestone No	**Milestone title**	**Delivery date**	**Fulfilled (ok) or deviations (d)***
M 2.1	Crops and forage material for organic diets are harvested and/or bought	10/2007	Ok
M2.2	Hen genotypes for experiment are selected	04/2007	Ok
M2.3	The analysis methods are set up	12/2007	
M2.4	Chemical analysis of feed ingredients and experimental diet formulation is ready	02/2008	
M2.5	Two different hen genotypes are reared and ready for egg production	03/2008	
M2.6	The main experiment on organic egg production is finished	10/2008	
M2.7	The sub-experiments with forage materials for egg laying hens are fin-ished	12/2008	
M2.8	Analysis of feed, diets and eggs are done	08/2009	
M2.9	All data are collected, statistics are evaluated and reports are ready	12/2009	

** Deviations are to be further discussed in D*

Workpackage 3						
Delive-rable No	**Deliverable title**	**Lead scien-tist**	**Delivery date**	**Allocated scientific person moths**	**Type of deliver-able**	**Fulfilled (ok) or de-viations (d)***
D3.1	Newsletter regarding broiler results	Klaus Hor-sted	02/2008	1	O	
D3.2	Newsletter regarding pests infestation	Hanne Lind-hard Peter-sen	03/2008	1	O	
D3.3	Paper on broiler results (growth ect.)	Klaus Hor-sted	01/2009	6	S	
D3.4	Newsletter sensory results for broilers	Judith Hen-ning	05/2009	1	O	
D3.5	Paper on sensory quality	Anders Hans Karls-son	08/2009	4	S	
D3.6	Newsletter on fruit quality	Hanne Lindhard Petersen	05/2009	0.5	O	
D3.7	Paper on effects of broilers on insects and fruit quality	Hanne Lindhard Petersen	12/2009	4	S	
D3.8	Report proposing strategies for inte-grated production	John Her-mansen	12/2009	3	R	
D3.9	National conference	John Her-mansen	10/2009	3	C	

Workpackage 3			
Milestone No	**Milestone title**	**Delivery date**	**Fulfilled (ok) or de-viations (d)***
M3.1	Poultry genotypes selected and reared and exp started at Fejø	02/2007	OK
M3.2	Protocol for slaughter procedure and quality assessment	06/2007	OK
M3.3	Broiler production results 1. year interpreted (preliminary)	01/2008	
M3.4	Sensory results 1. year interpreted (preliminary)	02/2008	
M3.5	Infestation data 1. year interpreted (preliminary)	02/2008	
M3.6	WP group meeting to reflect on findings and plan for year 2	03/2008	
M3.7	Trees and fruit quality assessed	10/2008	
M3.8	Carcasses for quality assessment ready	10/2008	
M3.9	Broiler production results 2. year interpreted (preliminary)	01/2009	
M3.10	Sensory results 1. year interpreted (preliminary)	02/2009	
M3.11	Infestation data 1. year interpreted (preliminary)	02/2009	
M3.12	Muscle characteristics assessed	02/2009	
M3.13	WP group meeting for exchange of results prior to reporting	03/2009	
M3.14	Final assessment of trees and fruit quality	08/2009	
M3.15	WP group meeting for integrative evaluation of results	10/2009	

Workpackage 4						
Delive-rable No	**Deliverable title**	**Lead scien-tist**	**Delivery date**	**Allocated scientific person moths**	**Type of deliver-able**	**Fulfilled (ok) or de-viations (d)***
D4.1	Newsletter presenting preliminary results of the main experimental activities with emphasis on the effect of genotype on the meat quality of entire male pigs, female pigs and first parity sows	Chris Claudi-Magnussen	10/2008	1	O	
D4.2	Newsletter presenting the preliminary results of the main experimental activities with emphasis on the effect of genotype and feeding strategy on daily gain and feed conversion in female pigs and first parity sows	Anne Grete Kongsted	10/2008	1	O	
D4.3	Paper on the effect of genotype and feeding strategy on daily gain and feed conversion in female slaughter pigs integrated in an organic cropping system	Anne Grete Kongsted	12/2009	4	S	
D4.4	Paper on the effect of genotype on daily gain and feed conversion in first parity sows integrated in an organic cropping system	Anne Grete Kongsted	12/2009	4	S	
D4.5	Paper on the effect of genotype on meat quality of entire male pigs slaughtered at a low weight	Chris Claudi-Magnussen	12/2009	4	S	
D4.6	Paper on the effect of genotype, feeding strategy and slaughter weight on meat quality of female slaughter pigs integrated in an organic cropping system	Chris Claudi-Magnussen	12/2009	4	S	
D4.7	Paper on the effect of genotype on meat quality of first parity sows integrated in an organic cropping system	Chris Claudi-Magnussen	12/2009	3	S	
D4.8	Paper concerning nutrient and energy efficiency in integrated organic pig production systems	Anne Grete Kongsted	12/2009	4	S	
D4.9	Report giving recommendations for a diversified organic pork production based on the results of the project and the experiences learned	Bent Hindrup Andersen	12/2009	3	R	
D4.10	Presentation at national conference on organic egg, poultry meat and pork production	Anne Grete Kongsted	12/2009	3	C	
D4.11	Newsletter presenting overall results of WP4	Anne Grete Kongsted	12/2009	2	O	

Workpackage 4			
Milestone No	**Milestone title**	**Delivery date**	**Fulfilled (ok) or deviations (d)***
M4.1	Recruitment of the traditional genotype is carried out	02/2007	OK
M4.2	Experimental paddock (crops) established	04/2007	OK
M4.3	Pigs from the 1st replicate are slaughtered	12/2007	
M4.4	Production data from the 1st replicate is analysed and interpreted (preliminary)	03/2008	
M4.5	Assessment of the meat quality from the 1st replicate is carried out and results are interpreted (preliminary)	04/2008	
M4.6	Pigs from the 2nd replicate are slaughtered and assessments of meat quality are carried out	04/2009	
M4.7	All data are collected, analysed and interpreted	06/2009	
M4.8	WP group meeting for discussion of results prior to reporting	06/2009	
M4.9	Reports are ready	12/2009	
Workpackage 5			

Deliverable No	Deliverable title	Lead scientist	Delivery date	Allocated scientific person moths	Type of deliverable	Fulfilled (ok) or deviations (d)*
D5.1	Newsletter with preliminary results of the effect of FRF on helminth infections and post-weaning diarrhoea	Maria Langkjær	06/2007	1	O	Ok
D5.2	International publication on the potential use of FRF to decrease helminth infections at weaning	Maria Langkjær	09/2007	3	S	d 02/2008
D5.3	International publication on the effect of FRF on *Campylobacter*	Annette Nygaard Jensen	09/2007	4	S	d 02/2008
D5.4	International publication on the effect of FRF on post-weaning diarrhoea	Tim K. Jensen	12/2007	5	S	d 03/2008

Workpackage 5			
Milestone No	**Milestone title**	**Delivery date**	**Fulfilled (ok) or deviations (d)***
M5.1	Completion and evaluation of parasitological analyses	05/2007	OK
M5.2	Completion and evaluation of *Campylobacter* analyses	05/2007	OK
M5.3	Completion and evaluation of bacteriological and pathological analyses	05/2007	12/2007
M5.4	Completion and evaluation of intestinal bacterial communities	06/2007	12/2007
M5.5	Completion and evaluation of in situ hybridization of key organisms in tissue samples	09/2007	12/2007

Workpackage 6						
Deliverable No	**Deliverable title**	**Lead scientist**	**Delivery date**	**Allocated scientific person moths**	**Type of deliverable**	**Fulfilled (ok) or deviations (d)***
D6.1	Report on the effect of final feeding FRF on boar taint and meat quality in entire and female pigs	Laurits Lydehøj Hansen	06/2007	1	R C O	OK OK OK
D6.2	Report on the impact of feeding treatments on odour, flavour, taste and aftertaste characteristics in the meat samples is elucidated	Derek Byrne	12/2007	3	R	
D6.3	International publication on the effect of final feeding FRF on boar taint and meat quality in entire and female pigs	Laurits Lydehøj Hansen	03/2008	5	S	
D.6.4	International publication on the effect of FRF on *Campylobacter* populations in pre-slaughter pigs	Dorte Lau Baggesen	06/2007	3	S	d 03/2008
D.6.5	International publication on the effect of FRF on intestinal bacterial community in pre-slaughter pigs	Dorte Lau Baggesen	12/2007	3	S	d 12/2008

Workpackage 6			
Milestone No	**Milestone title**	**Delivery date**	**Fulfilled (ok) or deviations (d)***
M6.1	Sensory profiling of meat samples	03/2007	OK
M6.2	Analysis of chemical measurements in relation to sensory	08/2007	OK
M.6.3	Completion and evaluation of *Campylobacter* analyses	02/2007	OK
M.6.4	Completion and evaluation of the T-RFLP analyses	06/2007	d 12/2008

(The nature of the deliverables must be indicated by S = publication in scientific journal with

peer review; P = publication in journals without peer review; R = reports; C = presentation at meetings and congresses or O = other types of deliverables, e.g., prototypes, models, web-sites, etc.).

D. Description of deviations and subsequent adjustments of plans

D5.2 have been postponed due to the delay of appropriate statistical analyses. The deliverable is expected to be fullfilled by 02/2008. If the parasitological results are too inconclusive, D5.2 may be combined with D5.3 within one solid peer-reviewed paper.
D5.3 is delayed and may be combined with D5.2, as mentioned above.
M5.3, M5.4, and M5.5 have all be delayed some months, partly because the Terminal restriction fragment analysis (T-RFLP) has been delayed due to implementation of a new instrument. This problem should now be solved. These milestones are expected to be reached 12/2007.
D 6.4. The publication is in preparation, but has been delayed due to a requirement of support for statistical analysis. This, however, has now been solved and the paper will be finished in the following months.
D 6.5 / M 6.4 The performance of the T-RFLP analyses for investigation of the intestinal bacterial communities has been delayed due to implementation of new equipment and consequently, the publication as well. However, it is important to note that the involved researcher has been employed as post.doc. at the institute and will continue this work to ensure its completion

Project publications and other products

1. Products from Organic Eprint

Hansen, Laurits Lydehøj (2007) Lupin i svinefoder mindsker ornelugt. In *Økologisk Jordbrug*, 7. September, No 391, page 16. Økologisk Landsforening.

Hansen, Laurits Lydehøj; Jensen, Jens Askov; Henckel, Poul; Hansen-Møller, Jens; Byrne, Derek V. and Syriopoulos, Kostas (2007) Pork quality related to the diet content of fermentable fibre-rich feedstuffs (chicory and lupine) with special emphasis on the effect on boar taint and meat quality [Korttidsindflydelsen af fodring med fermenterbare fiberrige fodermidler (lupiner og cikorie) før slagtning med særligt henblik på indflydelsen på kemisk ornelugt og teknologisk kødkvalitet]. [oral] Presentation at *23rd NJF congress 2007, Trends and Perspectives in Agriculture*, Copenhagen, June 26-29, 2007.

Hansen, Laurits Lydehøj; Jensen, Jens Askov; Henckel, Poul; Hansen-Møller, Jens and Syriopoulos, Kostas (2007) Effect of feeding fermentable fibrerich feedstuffs lupin and chicory prior to slaughter with special emphasis on the effect on chemical boar taint in organic entire male and female pigs and technological meat quality [Korttidsindflydelsen af fodring med fermenterbare fiberrige fodermidler (lupiner og chikorie) før slagtning med særligt henblik på indflydelsen på kemisk ornelugt og teknologisk kødkvalitet]. Report, Department of Food Science, Faculty of Agricultural Sciences, University of Aarhus.

Kongsted, A.G., Hermansen, J.E., Claudi-Magnussen, C., Andersen, B.H. & Jensen, H.F., 2007. Strategies for a diversified organic pork production – an upcoming product. NJF 23rd Congress 2007. Copenhagen June 26-29, 2007. NJF Report 2 (2), 445 pp.

2. Other products (oral presentations, public meetings, field days, etc.)

Hermansen, J.E. & Horsted, K., 2007. Økologisk kvalitet skal retfærdiggøre merpris. Landbrugsavisen 31:41

Langkjær,M., Baggesen,D.L., Nygaard Jensen, A., Jensen, T.K., Mølbak, L., Roepstorff, A., Thamsborg, S.M. 2007. Effekt af cikorierødder på fravænningsdiarré, tarmparasitter og zoonotiske parasitter hos svin. Nyhedsbrev på projekthjemmeside

F. Scientific education

Student Kostas Syriopoulos from University of Wageningen has made his Master thesis within this project and has finished this summer 2007 at the University of Wageningen.

G. National and international cooperation

The research group is attached to the project group around the company DanCikorie ApS, which produces dried chicory products (www.cikorie.com) as feed ingredient and carry out related concept and product development. I.e. Tim Kåre Jensen co-operates in investigating the effect of dried chicory on Lawsonia infections in pigs. Thus, this contact ensures an immediate dissemination of the research results.

H. Critical reflection on the project

Basicly we found no reason to change plans in the project. The stakeholder meeting in June 2007 confirmed that the research questions and activities were important.

8. Budget

A. Account for any change in budgets

B. Budget for the whole project (1.000 DKK)

Total consumption of funds from DARCOF and expected consumption this year and coming years

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	118,9	0	51,3	50,5	18,6	0	120,4
Technical personnel	70,56	0	37,95	31,45	8,36	0	77,76

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	5320	0	2050	2192	965	0	5207
Technical personnel	2074	0	982	1086	261	0	2329
Other operational costs	2131	0	887	919	205	0	2011
Equipment	44	0	5	5	5	0	15
Others (please specify)	449	0	230	196	30	0	456
Direct costs	10018	0	4154	4398	1466	0	10018
Indirect costs (20% of direct costs)	2004	0	832	878	294	0	2004
Total	12022	0	4986	5276	1760	0	12022

Comments:

9. Signatures and stamps

Name	Institute	Date	Signature
Head of project John E Hermansen		8/10-07	

Appendix I. Detailed budget

A. Budget for each participating institute (1.000 DKr)

Name of Institute and department:

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months Scientific personnel Technical personnel							

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries Scientific personnel Technical personnel							
Other operational costs							
Equipment							
Others (please specify)							
Direct costs							
Indirect costs (20% of direct costs)							
Total							

Comments:

B. Budget for each participating department (1.000 DKK)

Name of Institute and department: Faculty of Agricultural Sciences
Department of Agroecology and Environment

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	33,5	0	9	19,5	5	0	33,5
Technical personnel	12,46	0	4,75	6,95	0,76	0	12,46

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	1539	0	401	866	272	0	1539
Technical personnel	390	0	145	220	25	0	390
Other operational costs	404	0	181	168	55	0	404
Equipment	15	0	5	5	5	0	15
Others (please specify)	154	0	75	79	0	0	154
Direct costs	2502	0	807	1338	357	0	2502
Indirect costs (20% of direct costs)	500	0	161	267	72	0	500
Total	3002	0	968	1605	429	0	3002

Comments:

Name of Institute and department: Faculty of Agricultural Sciences
Department of Food Science

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	23	0	11	7	5	0	23
Technical personnel	8	0	3	3	2	0	8

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	1092	0	505	335	252	0	1092
Technical personnel	257	0	90	98	68	0	257
Other operational costs	214	0	47	137	30	0	214
Equipment	0	0	0	0	0	0	0
Others (please specify)	10	0	10	0	0	0	10
Direct costs	1573	0	653	570	350	0	1573
Indirect costs (20% of direct costs)	315	0	131	114	70	0	315
Total	1888	0	784	684	420	0	1888

Comments:

Name of Institute and department: Faculty of Agricultural Sciences
Department of Animal Health, Welfare and Nutrition

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	12	0	4	4	4	0	12
Technical personnel	7	0	2	3	2	0	7

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	576	0	183	192	201	0	576
Technical personnel	229	0	62	98	69	0	229
Other operational costs	312	0	91	185	36	0	312
Equipment	0	0	0	0	0	0	0
Others (please specify)	0	0	0	0	0	0	0
Direct costs	1117	0	336	475	306	0	1117
Indirect costs (20% of direct costs)	223	0	67	95	61	0	223
Total	1340	0	403	570	367	0	1340

Comments:

Name of Institute and department: Faculty of Agricultural Sciences
Department of Agricultural Engineering

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	12,5	0	4	7	1,5	0	12,5
Technical personnel	0	0	0	0	0	0	0

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	470	0	150	250	70	0	470
Technical personnel	0	0	0	0	0	0	0
Other operational costs	140	0	60	60	20	0	140
Equipment	0	0	0	0	0	0	0
Others (please specify)	140	0	75	65	0	0	140
Direct costs	750	0	285	375	90	0	750
Indirect costs (20% of direct costs)	150	0	57	75	18	0	150
Total	900	0	342	450	108	0	900

Comments:

Name of Institute and department: Faculty of Agricultural Sciences
Department of Horticulture

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	4,7	0	0,5	2,2	2	0	4,7
Technical personnel	9,9	0	4,2	4,2	1,5	0	9,9

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	259	0	26	117	116	0	259
Technical personnel	308	0	126	132	50	0	308
Other operational costs	145	0	76	52	17	0	145
Equipment	0	0	0	0	0	0	0
Others (please specify)	120	0	50	40	30	0	120
Direct costs	832	0	278	341	213	0	832
Indirect costs (20% of direct costs)	167	0	57	68	42	0	167
Total	999	0	334	410	255	0	999

Comments:

Name of Institute and department: RVAU
UFS

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	9,5	0	4	4	0	0	8
Technical personnel	7	0	7	7	0	0	14

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	459	0	106	138	0	0	244
Technical personnel	215	0	128	372	0	0	500
Other operational costs	173	0	40	87	0	0	127
Equipment	30	0	0	0	0	0	00
Others (please specify)	10	0	5	12	0	0	17
Direct costs	887	0	279	609	0	0	887
Indirect costs (20% of direct costs)	178	0	55	122	0	0	178
Total	1065	0	334	731	0	0	1065

Comments:
Expected consumption in 2007 is lover than original expected since some investigation of meal quality in chickens will be postponed to primo 2008 instead of late 2007.

Name of Institute and department: RVAU
DCEP

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	6	0	6	1*	0	0	6
Technical personnel	5	0	6	0	0	0	5

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	180	0	184	40*	0	0	180
Technical personnel	169	0	166	0	0	0	169
Other operational costs	236	0	175	20*	0	0	236
Equipment	0	0	0	0	0	0	0
Others (please specify)	15	0	15	0	0	0	15
Direct costs	600	0	540	60	0	0	600
Indirect costs (20% of direct costs)	120	0	108	12	0	0	120
Total	720	0	648	72	0	0	720

* see comments

Comments:

At the present we are writing up the results. However, the data sets are complicated and to obtain the optimal statistical calculations it is necessary with help from experienced statisticians. It has not been possible to get the needed help from the statistical department at LIFE yet, as they have been over-booked due to illness among staff members. At the present we are examining the possibilities for obtaining the statistical expertise from external sources.

This implicates that I will very much like to transfer 60,000 dkr to 2008, split up into 40,000 dkr for 1 months salary for a scientist, and 20,000 for operational costs. The 60,000 dkr are to be transferred from the ‘operational costs’ in the original budget, and therefore I will ask for permission to transfer 40,000 dkr from ‘operational costs’ to ‘salary’.

Name of Institute and department: DMRI

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	4,7	0	1,8	1,8	1,1	0	4,7
Technical personnel	8,4	0	3	3,3	2,1	0	8,4

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	218	0	82	82	54	0	218
Technical personnel	185	0	65	71	49	0	185
Other operational costs	180	0	67	68	45	0	180
Equipment	0	0	0	0	0	0	0
Others (please specify)	0	0	0	0	0	0	0
Direct costs	583	0	214	221	148	0	583
Indirect costs (20% of direct costs)	117	0	43	44	30	0	117
Total	700	0	257	265	178	0	700

Comments:

Name of Institute and department: DFVF

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	13	0	11	4	0	0	15
Technical personnel	12,8	0	8	4	0	0	12

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	525	0	413	172	0	0	585
Technical personnel	320	0	200	95	0	0	295
Other operational costs	327	0	150	142	0	0	292
Equipment	0	0	0	0	0	0	0
Others (please specify)	0	0	0	0	0	0	0
Direct costs	1172	0	763	409	0	0	1172
Indirect costs (20% of direct costs)	234	0	153	81	0	0	234
Total	1406	0	916	490	0	0	1406

Comments: Small adjustments (<15%) has been made between the different categories in the budget

C. Budget for co-financing from each participating institute (1.000 DKK)

Name of Institute and department: Faculty of Agricultural Sciences
Department of Agroecology and Environment

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel							
Technical personnel							

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	0	0	0	0	0	0	0
Technical personnel	0	0	0	0	0	0	0
Other operational costs	0	0	0	0	0	0	0
Equipment	0	0	0	0	0	0	0
Others (please specify)	66	0	32	34	0	0	66
Direct costs	66	0	32	34	0	0	66
Indirect costs (20% of direct costs)	689	0	320	261	108	0	689
Total	755	0	352	295	108	0	755

Comments:

Name of Institute and department: Faculty of Agricultural Sciences
Department of Food Science

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel							
Technical personnel							

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	0	0	0	0	0	0	0
Technical personnel	0	0	0	0	0	0	0
Other operational costs	253	0	51	203	0	0	253
Equipment	0	0	0	0	0	0	0
Others (please specify)	0	0	0	0	0	0	0
Direct costs	253	0	51	203	0	0	253
Indirect costs (20% of direct costs)	51	0	10	41	0	0	51
Total	304	0	61	243	0	0	304

Comments:

Name of Institute and department: Faculty of Agricultural Sciences
Department of Animal Health, Welfare and Nutrition

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel							
Technical personnel							

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	0	0	0	0	0	0	0
Technical personnel	0	0	0	0	0	0	0
Other operational costs	253	0	51	203	0	0	253
Equipment	0	0	0	0	0	0	0
Others (please specify)	0	0	0	0	0	0	0
Direct costs	253	0	51	203	0	0	253
Indirect costs (20% of direct costs)	51	0	10	41	0	0	51
Total	304	0	61	243	0	0	304

Comments:

Name of Institute and department: Faculty of Agricultural Sciences
Department of Agricultural Engineering

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel							
Technical personnel							

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	0	0	0	0	0	0	0
Technical personnel	0	0	0	0	0	0	0
Other operational costs	0	0	0	0	0	0	0
Equipment	0	0	0	0	0	0	0
Others (please specify)	72	0	36	36	0	0	72
Direct costs	72	0	36	36	0	0	14
Indirect costs (20% of direct costs)	14	0	7	7	0	0	14
Total	86	0	43	43	0	0	86

Comments:

Name of Institute and department: RVAU
UFS

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months							
Scientific personnel	2	0	0	2	0	0	2
Technical personnel	0	0	0	0	0	0	0

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries							
Scientific personnel	100	0	0	100	0	0	100
Technical personnel	0	0	0	0	0	0	0
Other operational costs	0	0	0	0	0	0	0
Equipment	0	0	0	0	0	0	0
Others (please specify)	0	0	0	0	0	0	0
Direct costs	100	0	0	100	0	0	100
Indirect costs (20% of direct costs)	20	0	0	20	0	0	20
Total	120	0	0	120	0	0	120

Comments:

Name of Institute and department: DMRI

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Man-months Scientific personnel Technical personnel							

Year:	Original budget	Consump-tion 2005/2006	Expected consump-tion 2007	2008	2009	2010	Total
Salaries Scientific personnel	0	0	0	0	0	0	0
Technical personnel	0	0	0	0	0	0	0
Other operational costs	0	0	0	0	0	0	0
Equipment	0	0	0	0	0	0	0
Others (please specify)	0	0	0	0	0	0	0
Direct costs	0	0	0	0	0	0	0
Indirect costs (20% of direct costs)	171	0	62	63	46	0	171
Total	171	0	62	63	46	0	171

Comments:

10. Signatures and stamps

Name	Institute	Date	Signature
Head of project John Hermansen		8/10-07	