



Danish Research Centre for Organic Farming



Application

for research funding under the research programme:

Research in Organic Food and Farming

International Research Co-operation and Organic Integrity

(DARCOF III 2006-2011)

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

1. **Project title and acronym** (acronym max. 10 letters):

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

2. **Project manager** (name, title, address, telephone, fax and e-mail. For projects in which several institutes participate, one project manager must be appointed to head the project):

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3. **The project is within the following research project theme** (name of the project theme according to 'Invitation til projektansøgninger'. Include argumentation, max. 10 lines, if the project is only a part of a project theme):

3.2.2 Kvalitet og integritet i økologiske æg og kødprodukter
(Quality and integrity of organic eggs and meat products).

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4. **Participating institute(s)** (name, address, telephone, fax and e-mail):

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5. Contact persons (title, name, address, telephone, fax and e-mail of one contact person appointed to represent each participating institute):

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7. Project duration: 3.0 years From: 01.01.07 To: 31.12.09

8. Main objective(s) (maximum 10 lines):

The overall objectives are to establish new production strategies of organic eggs, chicken meat, and pork in order to obtain new, high-quality products differing in characteristics from conventional products to meet consumer preferences and demands of possible new market segments. Specific objectives are to investigate *i*) which feed stuffs and feeding strategies can be used to obtain specific quality characteristic in eggs and pork, *ii*) if particular fructan rich feed may support the intestinal health of piglets and *iii*) which strategies for slaughter age of pigs and chickens of different genotypes can be introduced to obtain new high quality products. The insight gained by studying genotype, feeding, slaughter age and product quality interactions is expected to form the basis for proposing new production strategies that both comply with organic ideals of integrated production strategies and meet consumer demands for tasty and convenient organic foods.

9. Project summary in Danish (approximately 1 page, suitable for publication):

Kvalitet og integritet i økologiske æg, kyllinge- og svinekødsprodukter

Den økologiske æg-, kyllingekøds- og svinekødsproduktion i dagens Danmark er typisk karakteriseret ved en række kompromisser. Det gælder dyrevelfærdsmæssige hensyn, brug af genotyper der ikke nødvendigvis er bedst egnede til frilandsproduktion og genotype som ikke producerer ekstraordinær god spisekvalitet af produkterne. Det betyder, at de økologiske produkter kun er meget lidt forskellige fra de konventionelle, og at der er en betydelig priskonkurrence, hvilket i høj grad må anses for at være medvirkende til det relativt lave forbrug af især økologisk kyllinge- og svinekød. Disse forhold peger på, at der er behov for at nytænke produktionsmetoder for økologisk fjerkræ- og svineproduktion. Den grundlæggende idé i projektet er at etablere den nødvendige vidensbase for udvikling af nye produkter indenfor æg, kyllinge- og svinekød, som har en høj økologisk troværdighed, en høj spisekvalitet samt ikke mindst adskiller sig fra konventionelle produkter på en måde, som øger forbrugernes betalingsvillighed for produkterne.

Projektet er organiseret i 5 delprojekter samt en overordnet projektledelse (delprojekt 1).

I delprojekt 2 undersøges en række muligheder for gennem fodring og valg af genotype at opnå en høj og differentierbar kvalitet af økologiske æg. Der lægges særlig vægt på anvendelse af vegetation og foder, der indeholder karotenoider og flavonoider, og som påvirker æggenes smag og udseende. Endvidere undersøges de relevante muligheder for at dyrke og anvende danske proteinafgrøder for at tilgodese hønernes aminosyrebehov, herunder især methionin forsyningen.

Delprojekt 3 fokuserer på mulighederne for en integreret kyllinge- og æbleproduktion. Her undersøges betydningen af at opdrætte kyllinger i æbleplantager for forekomst og skadesvirkning af især æblehvepse, der er et stort problem i økologisk frugtavl. Samtidig repræsenterer frugtplantager en god mulighed for at opdrætte kyllinger med særlige smagsegenskaber. I projektet undersøges hvorledes forskellige genotyper af slagtekyllinger, herunder mere langsomvoksende typer, påvirkes af en opdræts- og fodringsstrategi, der passer til æbleplantagens krav. Samtidig klarlægges betydningen for fjerkræets muskeludvikling samt smag og andre sensoriske egenskaber.

I delprojekt 4 undersøges strategier for en diversificeret svineproduktion. Her undersøges mulighederne for at basere nye produkter på kød fra små ikke-kastrerede hangrise, større so-grise end der normalt anvendes, samt søer, der slagtes efter 1. læg – en kombination, der har et ressourcemæssigt perspektiv, især ved en sæsonbaseret produktion. I projektet undersøges betydningen af genotyper, idet der inkluderes genotyper med forbedrede spisekvalitetsegenskaber. De forskellige genotypers muligheder for at tilgodese deres næringsstofbehov ved naturlig fødesøgning på forskellige afgrøder undersøges, idet der anvendes afgrøder, der forventes at have positive effekter på spisekvaliteten. Mulighederne for at udnytte de

forskellige typer slagtekroppe undersøges, og der foretages en omfattende undersøgelse af kød- og spisekvalitetssegenskaber.

I delprojekt 5 studeres tarmfloraen i smågrise født på friland, hvor der typisk er en høj belastning med endoparasitter. Specielt undersøges om det gennem anvendelse af fruktanrige fodermidler som cikorie er muligt at reducere parasitbelastningen og risikoen for at smågrisene får fravænningsdiarre, hvilket er et alvorligt problem i økologiske svinehold. Ligeledes undersøges om anvendelse af fruktanrige fodermidler kan reducere forekomsten af *Campylobacter*, der er et udbredt forekommende zoonotisk patogen. Gennem anvendelse af DNA teknik til bestemmelse af bakteriedynamikken i tarmen fås en ny indsigt i hvorledes tarmsundheden kan fremmes.

Problemstillingen ved undladelse af kastration af hangrise af etiske og dyrevelfærdsmæssige hensyn er udgangspunktet for delprojekt 6. Ved produktion af hangrise er der en betydelig risiko for at kødet får ornelugt. I delprojektet undersøges om det er muligt ved anvendelse af fruktanrigt foder (cikorie og lupiner) alene i perioden kort før slagtning (1 og 2 uger) ved normal slagtevægt er muligt at undgå forhøjet skatolindhold og ornelugt i kødet ved ukastrerede hangrise.. Det er hypotesen, at dette samtidigt forbedrer de generelle sensoriske egenskaber for kød fra sogrise såvel som hangrise. I dette delprojekt belyses det endvidere, hvorvidt den kortvarige anvendelse af fruktanrige fodermidler umiddelbart før slagtning påvirker den generelle tarmøkologi og i særdeleshed om niveauet af *Campylobacter* i fæces og dermed risikoen for forurening af slagtekroppe mindskes.

Med denne profil forventes projektet at give en god baggrund for at kunne foreslå produktionsmetoder, der på samme tid opfylder økologiske idealer om en integreret produktion og forbrugernes forventninger til produktionsmetoder og kvalitetsprodukter fra fjerkræ- og svineproduktionen.

10. Budget:

The proposed budget must be inclusive of increases in the level of salaries and prices and specified on an annual basis. The proposed budget must specify the number of man-months and related salary costs for scientific staff and non-scientific staff, other direct costs and costs to buy equipment. To this should be added an overhead contribution of 20% of the direct costs.

Salary levels must not exceed union levels for comparable positions in the Public Service (e.g. laboratory assistant, researcher or senior researcher).

Official journeys must follow government regulations.

The applicants are generally expected to procure and make available all necessary equipment for the project themselves. Only in exceptional cases when this is not possible may expenditures for the acquisition of equipment be included in the budget for consideration.

Funding is provided exclusive of the recipient's input VAT (purchase VAT) and output VAT (sales VAT).

For government institutes funding is provided in accordance with the budget guidelines issued by the Ministry of Finance for research activities receiving programme funding and the funding is only granted for one year at a time.

If private business partners co-finance or take part in the project otherwise then all partners have to enter a co-operation agreement or provide other kind of documentation of the co-operation cf. 'Invitation til projektansøgninger'.

Note that budgets must be made for the entire project as well as for each participating institution.

Budget for the entire project—broken down by calendar year							
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources		
	Person months	DKK	Person months	DKK	Person month	DKK	
1st calendar year 2007	Salaries/academic staff	67,3	2.865.254	2	100.000		
	Salaries/techn.-adm. staff	39,43	1.122.048				
	Equipment		5.000				
	Operational expenses		1.248.450		101.400		
	Others (please specify below)		75.400		32.300		
	<i>Experimental stations</i>		75.000		36.000		
	<i>Travel</i>		35.000				
	<i>External work</i>		50.000				
Total direct costs		5.476.152		269.700			
Overhead (20 % of direct costs)		1.095.230		430.237			
Total		6.571.382		699.937			
2nd calendar year 2008	Salaries/academic staff	33	1.500.144				
	Salaries/techn.-adm. staff	22,77	690.410				
	Equipment		34.566				
	Operational expenses		679.265		405.600		
	Others (please specify below)		78.500		33.550		
	<i>Experimental stations</i>		65.000		36.000		
	<i>Travel</i>						
	<i>External work</i>		40.000				
Total direct costs		3.087.885		475.150			
Overhead (20 % of direct costs)		617.577		412.485			
Total		3.705.462		887.635			
3rd calendar year 2009	Salaries/academic staff	18,6	954.677				
	Salaries/techn.-adm. staff	8,36	261.712				
	Equipment		5.000				
	Operational expenses		203.000				
	Others (please specify below)						
	<i>Experimental stations</i>						
	<i>Travel</i>						
	<i>External work</i>		30.000				
Total direct costs		1.454.389					
Overhead (20 % of direct costs)		290.878		153.573			
Total		1.745.267		153.573			
Salaries/academic staff							
Salaries/techn.-adm. staff							
Equipment							
Operational expenses							
Others (please specify below)							
Total direct costs							
Overhead (20 % of direct costs)							
Total							
Total for the 3 years		12.022.111		1.741.145			

Budget each participating Institute DAE, DIAS						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
2nd calendar year 2007	Salaries/academic staff	16,5	726.950			
	Salaries/techn.-adm. staff	5,93	181.000			
	Equipment		5.000			
	Operational expenses		180.650			
	Others (please specify below)		75.400		32.300	
Total direct costs		1.169.000		32.300		
Overhead (20 % of direct costs)		233.800		320.554		
Total		1.402.800		352.854		
3rd calendar year 2008	Salaries/academic staff	12	540.400			
	Salaries/techn.-adm. staff	5,77	183.600			
	Equipment		5.000			
	Operational expenses		167.950			
	Others (please specify below)		78.500		33.550	
Total direct costs		975.450		33.550		
Overhead (20 % of direct costs)		195.090		260.992		
Total		1.170.540		294.542		
4th calendar year 2009	Salaries/academic staff	5,0	272.200			
	Salaries/techn.-adm. staff	0,76	25.150			
	Equipment		5.000			
	Operational expenses		55.000			
	Others (please specify below)					
Total direct costs		357.350				
Overhead (20 % of direct costs)		71.470		107.563		
Total		428.820		107.563		
Total for the 3 years		3.002.160		754.959		

Budget for each participating institution — Name of institution: DFS, DIAS						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	11	505.544			
	Salaries/techn.-adm. staff	3	90.400			
	Equipment					
	Operational expenses		47.000		50.700	
	Others (please specify below)					
	<i>Travel</i>		10.000			
Total direct costs		652.944		50.700		
Overhead (20 % of direct costs)		130.589		10.100		
Total		783.533		60.800		
2nd calendar year 2008	Salaries/academic staff	7	335.400			
	Salaries/techn.-adm. staff	3	98.100			
	Equipment					
	Operational expenses		137.000		202.800	
	Others (please specify below)					
	<i>Travel</i>					
Total direct costs		570.500		202.800		
Overhead (20 % of direct costs)		114.100		40.600		
Total		684.600		243.400		
3rd calendar year 2009	Salaries/academic staff	5	251.600			
	Salaries/techn.-adm. staff	2	68.600			
	Equipment					
	Operational expenses		30.000			
	Others (please specify below)					
	Total direct costs		350.200			
Overhead (20 % of direct costs)		70.040				
Total		420.240				
4th calendar year 2010	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
	Total direct costs					
Overhead (20 % of direct costs)						
Total						
Total for the 3 years		1.888.373		304.200		

Budget for each participating institution — Name of institution: HWN, DIAS						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	4	182.600			
	Salaries/techn.-adm. staff	2	62.400			
	Equipment					
	Operational expenses		91.000		50.700	
	Others (please specify below)					
Total direct costs		336.000		50.700		
Overhead (20 % of direct costs)		67.200		10.100		
Total		403.200		60.800		
2nd calendar year 2008	Salaries/academic staff	4	191.700			
	Salaries/techn.-adm. staff	3	98.100			
	Equipment					
	Operational expenses		185.000		202.800	
	Others (please specify below)					
Total direct costs		474.800		202.800		
Overhead (20 % of direct costs)		94960		40.600		
Total		569.760		243.400		
3rd calendar year 2009	Salaries/academic staff	4	201.300			
	Salaries/techn.-adm. staff	2	68.600			
	Equipment					
	Operational expenses		36.000			
	Others (please specify below)					
Total direct costs		305.900				
Overhead (20 % of direct costs)		61.180				
Total		367.080				
4th calendar year 2010	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
Total direct costs						
Overhead (20 % of direct costs)						
Total						
Total for the 3 years		1.340.040		304.200		

Budget for each participating institution — Name of institution: AEN, DIAS						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
2nd calendar year 2007	Salaries/academic staff	6	220.000			
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses		60.000			
	Others (please specify below)					
	<i>Experimental stations</i>		75.000		36.000	
Total direct costs		355.000		36.000		
Overhead (20 % of direct costs)		71.000		7.200		
Total		426.000		43.200		
3rd calendar year 2008	Salaries/academic staff	5	190.000			
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses		60.000			
	Others (please specify below)					
	<i>Experimental stations</i>		65.000		36.000	
Total direct costs		315.000		36.000		
Overhead (20 % of direct costs)		63.000		7.200		
Total		378.000		43.200		
4th calendar year 2009	Salaries/academic staff	1.5	60.000			
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses		20.000			
	Others (please specify below)					
	<i>Experimental stations</i>					
Total direct costs		80.000				
Overhead (20 % of direct costs)		16.000				
Total		96.000				
Total for the 3 years		900.000		86.400		

Budget for each participating institution — Name of institution: DHC, DIAS						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	1.5	78.624			
	Salaries/techn.-adm. staff	4.2	126.126			
	Equipment					
	Operational expenses		75.900			
	Others (please specify below)					
	<i>External work</i>		50.000			
Total direct costs		330.650				
Overhead (20 % of direct costs)		66.130				
Total		396.780				
2nd calendar year 2008	Salaries/academic staff	1.2	66.044			
	Salaries/techn.-adm. staff	4.2	132.432			
	Equipment					
	Operational expenses		51.600			
	Others (please specify below)					
	<i>External work</i>		40.000			
Total direct costs		290.076				
Overhead (20 % of direct costs)		58.015				
Total		348.091				
3rd calendar year 2009	Salaries/academic staff	2.0	115.577			
	Salaries/techn.-adm. staff	1.5	49.662			
	Equipment					
	Operational expenses		17.000			
	Others (please specify below)					
	<i>External work</i>		30.000			
Total direct costs		212.239				
Overhead (20 % of direct costs)		42.448				
Total		254.687				
Salaries/academic staff						
Salaries/techn.-adm. staff						
Equipment						
Operational expenses						
Others (please specify below)						
Total direct costs						
Overhead (20 % of direct costs)						
Total						
Total for the 3 years		999.558				

Budget for each participating institution — Name of institution: UFS, RVAU						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	7,5	364.800	2	100.000	
	Salaries/techn.-adm. staff	3,5	108.000			
	Equipment					
	Operational expenses		163.816			
	Others (please specify below)					
	<i>Travel</i>		10.000			
Total direct costs		646.616		100.000		
Overhead (20 % of direct costs)		129.323		20.000		
Total		775.939		120.000		
3rd calendar year 2008	Salaries/academic staff	2.0	94.600			
	Salaries/techn.-adm. staff	3.5	107.400			
	Equipment		29.566			
	Operational expenses		9.715			
	Others (please specify below)					
	Total direct costs		241.281			
Overhead (20 % of direct costs)		48.256				
Total		289.537				
4th calendar year 2009	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
	Total direct costs					
Overhead (20 % of direct costs)						
Total						
Total for the 3 years		1.065.476		120.000		

Budget for each participating institution — Name of institution: DCEP, RVAU						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
2nd calendar year 2007	Salaries/academic staff	6	179,736			
	Salaries/techn.-adm. staff	5	169,210			
	Equipment		0			
	Operational expenses		236,084			
	Others (please specify below)					
	<i>Travel</i>		15,000			
Total direct costs			600,030			
Overhead (20 % of direct costs)			120,006			
Total			720,036			
3rd calendar year 2008	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
	Total direct costs					
Overhead (20 % of direct costs)						
Total						
4th calendar year 2009	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
	Total direct costs					
Overhead (20 % of direct costs)						
Total						
Total for the 3 years			720,036			

Budget for each participating institution — Name of institution: DMRI						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
2nd calendar year 2007	Salaries/academic staff	1.8	82.000			
	Salaries/techn.-adm. staff	3.0	64.912			
	Equipment					
	Operational expenses		67.000			
	Others (please specify below)					
Total direct costs		213.912				
Overhead (20 % of direct costs)		42.782		62.283		
Total		256.694		62.283		
3rd calendar year 2008	Salaries/academic staff	1.8	82.000			
	Salaries/techn.-adm. staff	3.3	70.778			
	Equipment					
	Operational expenses		68.000			
	Others (please specify below)					
Total direct costs		220.778				
Overhead (20 % of direct costs)		44.156		63.093		
Total		264.934		63.093		
4th calendar year 2009	Salaries/academic staff	1.1	54.000			
	Salaries/techn.-adm. staff	2.1	49.700			
	Equipment					
	Operational expenses		45.000			
	Others (please specify below)					
Total direct costs		148.700				
Overhead (20 % of direct costs)		29.740		46.010		
Total		178.440		46.010		
Total for the 3 years		700.068		171.386		

Budget for each participating institution — Name of institution: DFVF						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
2nd calendar year 2007	Salaries/academic staff	13	525.000			
	Salaries/techn.-adm. staff	12,8	320.000			
	Equipment					
	Operational expenses		327.000			
	Others (please specify below)					
	<i>Travel</i>					
Total direct costs		1.172.000				
Overhead (20 % of direct costs)		234.400				
Total		1.406.400				
3rd calendar year 2008	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
	Total direct costs					
Overhead (20 % of direct costs)						
Total						
4th calendar year 2009	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
	Total direct costs					
Overhead (20 % of direct costs)						
Total						
Total for the 5 years		1.406.400				

11. Signatures:

Name	Institute	Date	Signature
Project manager: John Hermansen	Danish Institute of Agricultural Sciences, Dept. of Agroecology		
Institute management: Kirsten Jakobsen	Danish Institute of Agricultural Sciences, Dept. of Animal Health, Welfare and Nutrition		
Institute management: Jesper Waagepetersen	Danish Institute of Agricultural Sciences, Dept. of Agroecology		
Institute management: Jacob Holm Nielsen	Danish Institute of Agricultural Sciences, Dept. of Food Science		
Institute management: Svend Christensen	Danish Institute of Agricultural Sciences, Dept. of Agricultural Engineering		

11. Signatures:

Name	Institute	Date	Signature
Project manager: John Hermansen	Danish Institute of Agricultural Sciences, Dept. of Agroecology		
Institute management: Claus Fertin	Danish Meat Research Institute		

11. Signatures:

Name	Institute	Date	Signature
Project manager: John Hermansen	Danish Institute of Agricultural Sciences, Dept. of Agroecology		
Institute management: Birgit Nørrung	Danish Institute for Food and Veterinary Research		
Institute management: Grete Bertelsen	The Royal Veterinary and Agricultural University, Dept. of Food Science		
Institute management: Christian Friis	The Royal Veterinary and Agricultural University, Dept. of Veterinary Pathobiology		

12. Description of the project:

The description of the project must be given in Annex 1 and according to the guidelines described herein.