

STRATEGIC PRIORITY AREA 1: CHARACTERIZATION, INVENTORY AND MONITORING OF TRENDS AND ASSOCIATED RISKS

Actions undertaken during the past year

- (a) *Demographic relieves*;
- (b) *individual typification* as prodrome for the biodiversity safeguard and characterization of a food product of animal origin to identify some biomolecules with particular 'nutritional', 'functional' and 'healthy' value, in order to achieve a dynamic status of human welfare (*from fork to farm, food, health and well being*); in particular:
 - *determination of chromosomal set* to identify possible natural, both numerical and structural chromosomal modifications, by banding karyotype analysis;
 - *localization of particular DNA sequences on the chromosomes* by FISH (*Fluorescence in Situ Hybridization*) technique;
 - *evaluation of genome stability* by SCE test (*Sister Chromatid Exchange*) and micronucleus test;
 - *evaluation of nuclear and/or mitochondrial DNA "oxidative" damage* induced by ROS (*Reactive Oxygen Species*) through *Comet test*;
 - *individuation of polymorphisms in:*
 - *genetic markers*: microsatellites or STR (*Short Tandem Repeat Sequence*) or SSR (*Simple Sequence Repeat*); RFLP (*Restriction Fragment Length Polymorphism*); SNP (*Single Nucleotide Polymorphism*); CNV (*Copy Number Variation*) or CNP (*Copy Number Polymorphism*);
 - *loci candidate for quality characteristics of a food product of animal origin:*
 1. *Pig*: CRC (*Calcium Release Channel*) or RYR1 (*Ryanodine Receptor*) or halothane locus in order to individuate carriers of mutated allele responsible for MH (*malignant hyperthermia*), which among the other things, causes 'exudative myopathy (PSE meat, *Pale Soft Exudative*); RN (*rendement Napole*) or PRKAG3 (*protein kinase AMP-activated γ 3 subunit*) locus in order to individuate carriers of mutated allele responsible for detrimental meat characteristics (lowering of water holding capacity) and yield at slaughtering; H-FABP (*Heart-Fatty Acid Binding Protein*), FASN (*Fatty Acid Synthase*), DECR1 (*Mitochondrial 2,4 Dienoyl – CoA Reductase*), MC4R (*Melanocortin Receptor 4*) and SCD (*Stearoyl CoA desaturase*) loci, involved in fatty acid metabolism;
 2. *Sheep*: milk protein loci
- *determination of transcriptome profile* by *microarray* approach validated by *PCR Real time* to characterize, in a given moment of the cell cycle, simultaneously, 'not expressed' and 'expressed' DNA segments and, for the latter, the 'differentially expressed' segments due to environmental and genetic factors;
- *meat quality*: (i) rheological characteristics on raw and cooked meat; (ii) colorimetric profile of some muscles; (iii) chemical centesimal composition;
- *milk quality*: somatic cell count, pH measures, determination of chemical centesimal composition (water, lipids, proteins, lactose and minerals) and renneting aptitude of milk obtained from genetic types (GTs) and ancient autochthonous genetic types (AAGTs) subjected to regular milk recordings according to *International Committee for Animal Recording* (ICAR) official standards;

- *characterisation of proteomic profile* of: (i) raw meat and its products (ham, etc.) obtained from pig GTs and AAGTs controlled by I.NFP; (ii) dairy products obtained from cattle and sheep GTs and AAGTs controlled by I.NFP;
- *characterisation of peptide profile* of dairy products obtained from cattle and sheep GTs and AAGTs controlled by I.NFP;
- *characterisation of lipid profile* of: (i) ripened products obtained from pig GTs and AAGTs controlled by I.NFP; (ii) dairy products obtained from cattle and sheep GTs and AAGTs controlled by I.NFP;
- *characterisation of flavour profile* of: (i) ripened products obtained from pig GTs and AAGTs controlled by I.NFP; (ii) dairy products obtained from cattle and sheep GTs and AAGTs controlled by I.NFP;
- *characterisation of sensory profile (panel test)*;
- *reproductive characterisation*: (i) routine gynaecological controls; (ii) evaluation, through computerized sperm analysis system (*Hamilton Thorne Biosciences – IVOS*), of some somatic and kinetic parameters of sperm cell, among which: *path velocity* (VAP, $\mu\text{m}/\text{sec}$), *progressive velocity* (VSL, $\mu\text{m}/\text{sec}$), *track speed* (VCL, $\mu\text{m}/\text{sec}$), *straightness* (STR= VSL/VAP, %), *beat cross frequency* (BCF, Hertz), *Linearity* (LIN= VSL/VCN, %), *Lateral amplitude* (ALH, μm), *elongation* (ELON, %), *area* (μm^2).

Actions planned for the next year

Pursuing of all activity above cited, in particular, in the context of the following projects:

- (a) “Research and innovation in the activities of animal genetic improvement by molecular genetic techniques for the competitiveness of national zootechnical system”
- (b) “Innovation of pig meat quality concept”
- (c) “Safeguard of biodiversity for the innovation in the obtainment of ‘local typified labeled’ food product of animal and vegetable origin” (Campania Region)
- (d) “Valorization of Casertana pig AAGT ‘pure’ and Casertana x GT D.IT crossbred” (Ministry of Agriculture, Food and Forestry Politics)
- (e) “Breed traceability of sheep meat by molecular approach” (Ministry of Agriculture, Food and Forestry Politics)
- (f) “Research and development - Casertana pig autochthonous genetic type – raw meat” (Ministry of Agriculture, Food and Forestry Politics)
- (g) “Research and development - Casertana pig autochthonous genetic type – ripened products” (Ministry of Agriculture, Food and Forestry Politics)
- (h) “Research and development – Laticauda breed” (Ministry of Agriculture, Food and Forestry Politics).

2. STRATEGIC PRIORITY AREA 2: SUSTAINABLE USE AND DEVELOPMENT

Action undertaken during the past year

Collaboration and participation to the organization of training courses:

1. Regional Training Pole (Campania, Italy) IFTS-Agrifood Sector called ‘*Mario Vetrone for Agrifood*’;
2. ‘*Pole for training of superior technician in agriculture*’ (Campania Region, Italy).

Various conventions:

1. Universities:
 - Samnium University
 - 2nd University of Naples
 - ‘Federico II’ of Naples
 - Molise University
 - Basilicata University

aimed at PhD, degree thesis, training and stage;

2. Professional Institutes with ‘chemical-biological’ character

3. Lyceum .

Action planning for the next year

Pursuing of the collaboration activity above cited.

STRATEGIC PRIORITY AREA 3: CONSERVATION

Actions undertaken during the past year

Research activity in the context of the following projects:

- (a) "ERFP Call for action 2007 - 2008 - *in situ* conservation "
- (b) "Rescue of pig autochthonous genetic type of Southern Dauni mountains" (Mountain Community of Southern Dauni mountains)
- (c) "Identification, rescue and valorization of Maremma Zootechnical Genome" (Grosseto Province): Macchiaiola Maremmana or Romana autochthonous pig
- (d) "Characterization of some Latial Gts/AGTs by microsatellite markers" (Agency for Agriculture Development and Innovation of Latium Region)
Equids: Traditional Maremmano AGT, Esperia Pony GT; Al lumiere Ass AGT, Viterbo Ass AGT, Cicolano horse GT, Monti Lepini Ass AGT ; *Sheep*: Quadricorna AGT; *Goat*: Tawny Goat; *Pig*: Monti Lepini Black AGT, Reatino Black AGT
- (e) "Research and innovation in the activities of animal genetic improvement by molecular genetic techniques for the competitiveness of national zootechnical system". *Pig*: Casertana AGT, Calabrian AGT; *Sheep*: Bagnolese AGT, Laticauda GT.

Actions planned for the next year

- (a) "Rescue of pig autochthonous genetic type of Southern Dauni mountains" (Mountain Community of Southern Dauni mountains)
- (b) "Organization of Casertana genetic Centre" (Campania Region)
- (c) "Valorization of AAGT Casertana pig 'pure' and Casertana x GT D.IT crossbred " (Ministry of Agriculture, Food and Forestry Politics)
- (d) "Characterization of some Latial Gts/AGTs by microsatellite markers" (Agency for Agriculture Development and Innovation of Latium Region)
- (e) "Research and innovation in the activities of animal genetic improvement by molecular genetic techniques for the competitiveness of national zootechnical system".