

Better Training for Safer Food Initiative

Relevance of animal-based indicators for pig welfare assessment (part I)

Training course on "Animal Welfare in pig production"

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Animal welfare

- Based on the emotional state
- Based on the environment
- Based on the biological functioning

Emotional state

Similar behaviour: gazing

Different emotional state?

Clear with fear and pain, but...

Environment

Natural conditions?

Extensive always better than intensive?

Biological functioning

HOMEOSTASIS

STRESS FACTORS ↔ STRESS RESPONSE

Environmental stimulus → Brain

Brain → Stress response Release of CRF

Behavioural changes Physiological changes

Animal welfare

Biological functioning, presence of abnormal behaviours or incapacity to perform some important behaviours and the emotional state must all be considered

Animal welfare can not be assessed by using only one indicator

Animal based measures can be classified in very different types

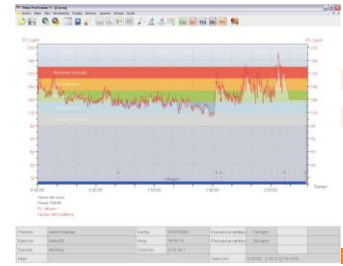
Type of parameters

Physiological measures
Hormones
Blood composition
Electrolytes, metabolites, enzymes...
Performance
Clinical measures
Behaviour

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Physiological measures

Heart rate
Respiration
Temperature



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Hormones

Adrenaline in blood
Cortisol in blood/saliva/hair
Glucagon/Insuline
Vasopressin



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Adrenaline in blood

Appears and disappears very quickly

Cortisol in blood

Restraining animals can interfere in the results

Cortisol in saliva

Less interference with handling
Takes longer in being affected (around 5-10 minutes)

Cortisol in hair

Chronic stress

Glucagon/Insuline

Linked to glucose levels in blood

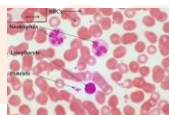
Vasopressin

Interesting after a transport

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Blood composition

Packed-cell volume
Heterophil:lymphocyte ratios
White blood count
Neutrophils
Lymphocytes
Neutrophils/Lymphocytes ratio



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Glucose

Lactate or lactate deshydrogenase (LDH)

Creatine Kinase (CK)

APP's

Total protein

Albumine

Sodium/osmorality

Non-sterified fatty acids or free fatty acids

B-hydroxybutirate

Urea



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Glucose

- Increases during the stress response
- Decreases if the animals is not fed for a long time

Lactate and LDH

- Lactate is associated with anaerobic metabolism of glucose in the organism
- LDH is associated with tissue damage

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Creatin Kinase (CK)

- The presence in blood is associated with muscle damage or vigorous exercise
- It is a little bit more specific than LDH

APP's

- Non-specific reaction to tissue damage (infection, inflammation, neoplasia...)
- Haptoglobin, pig-MAP, C-reactive protein, SAA

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Total protein/albumine/osmorality

- Used to detect states of dehydration

Free fatty acids (FFA)

- Released in blood when glucose is lacking
- Sign of hunger

B-hydroxybutirate

- It is a ketone produced whe the animal is using fatty acids as source of energy.
- Related with hunger

Urea

- It is related with the use of protein as source of energy.
- Related with hunger

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Performance

- Body weight and state
- Carcass weight
- Liver weight



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Clinical measures

- Lesions
- Diseases
- Death



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Behavioural measures

- Fear
- Apathy/excitation
- Exploratory behaviour
- Aggressive behaviour
- Urination, defecation
- Stereotypies, redirected behaviours
- Vocalisations
- Shivering/panting



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Behavioural measures

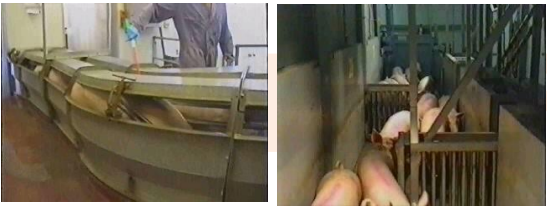


Figure 1: Pig farming conditions



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THANKS!!!

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