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Fleischwirtschaft International

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Production: **Modern technology for quality hams**

3 / 2012

Curing
Naturally cured meat products

Professional Clothing
Assuring hygiene in production processes

Hygiene
Keeping halal production systems clean

Research & Development
Analysis of meat under aspects of microbiology and biogenic amines

Product Safety

Tracking pork with RFID ear tags

Tracking pork with RFID ear tags

A large scale European RFID UHF pilot project is currently taking place in Europe

PureSpekt, a Radio Frequency Identification (RFID) solutions company from Germany, is supplying UHF inlays specifically designed for live stock ear tags, that are being embedded into MS Schippers standard animal ear tags. MS Schippers, an animal ear tagging manufacturer from the Netherlands is producing RFID UHF enabled ear tags for the animal production industry. UHF inlays specifically designed for live stock ear tags, are being supplied and embedded into the standard animal tags available on the market.

By Charlie Purser

The objective of project "Pig Affairs" is to trace and track every individual animal from birth to the slaughterhouse with its individual information (e.g. personal identification number, birth, vaccination....) stored on a chip. The chip is embedded into standard animal Tags available on the market. The read distance, using a 2W reader, is 2-3 meters using an animal ear tag size of Ø 25 mm – 27 mm.

An enabled RFID UHF animal tag is a technology, where by a passive UHF Inlay has been embedded (not visible) into a standard animal tag, produced at temperatures of up to 220 °C and uses the latest IC Technology from the company Impinj - Monza4D chip. The UHF animal tag functions without line of sight and has the robustness of standard animal tags.

Necessity of intensive livestock farming

It is estimated that the World Wide population has crossed the 7 bill. mark (United States Census) and that by 2030 two earths (WWF) will be required to sustain the human being. At the moment we are using 50% (European commission A) more of its resources than the earth can provide.

With a large population that requires feeding, large food resources need to be available, which generally can only be produced through industrialised (meat) production / intensive live stock farming.

Intensive live stock farming however has also been linked to human ill health, hence all the more to ensure traceability and transparency within the food chain.

Animal traceability is not a new phenomenon, after the mad

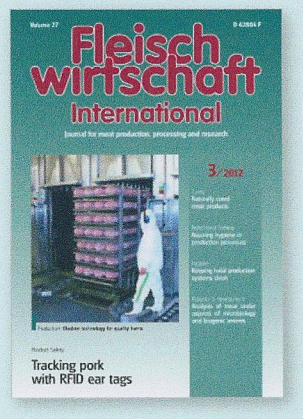
BSE lead to regulations

Tab. 1: Latest regulations about electronic tagging in the EU

EC Regulation 21/2004 Electronic identification (eID)	International Standards Organization (ISO) Radio Frequency Identification (RFID) regulations
Goats & Sheep	ISO 11784 (Code structure) ISO 11785 (transponder activation & information transfer)

Source: PURSER

E-paper!



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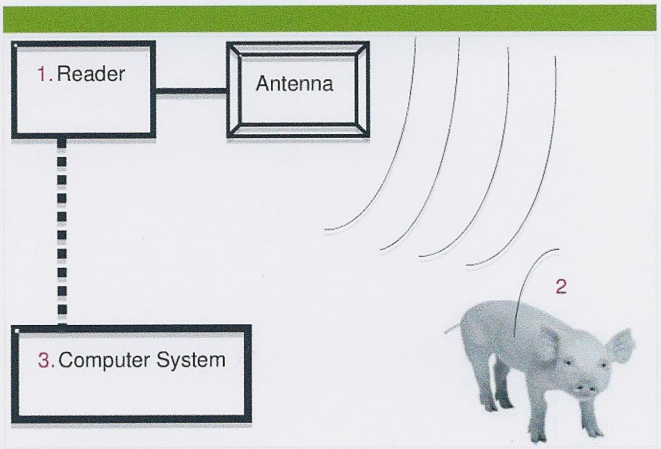
cow disease (BSE) out break in the mid 1990s, the European Union continued to endorse new regulations (based on council directive 92/102/EEC) for the identification and tracing of cattle, pigs, goats, and sheep - with the objective of installing a platform for food security in Europe.

The latest regulation was made in 2004 (European Commission B), which states that by law goats and sheep are required to be identified electronically using Low Frequency (LF) technology (Tab. 1). The general advantages of using eID technology, is that animals can be automatically identified (by the animals unique eID number) without handling the animal.

At the moment EU regulations do not cover all animals for eID tagging. However as mentioned above, it is the objective of the European Commission for Health and Consumers on animal and health strategy to have all livestock that enters the food chain electronically tagged. The benefits are manifold:

- enhancement of consumer protection
- improvement of disease prevention
- control and crisis management
- strengthening of the present tracing and tracking system
- reduction of administrative tasks
- reduction of paper tasks
- reduction of labor costs
- brand protection
- proactive rather than reactive system



Source: Purser

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Fig. 1: Functioning of RFID in pig's ears
1. The Reader transfers energy to the antenna which in turn emits electromagnetic waves through the air to the ear tag.
2. The RFID ear tag uses the energy (electromagnetic waves) to return a signal in form of the information saved to the transponder chip to the antenna.
3. The antenna/reader, which received the ear tag transponder response, processes the information accordingly with its IT system (back end).

What is Radio Frequency Identification (RFID)?

RFID is contactless technology, which uses air interface (electromagnetic waves) to communicate with the environment. In figure 1, the object is a pig that has an RFID ear tag attached to its ear on which information has been stored. Several common frequencies (e.g. LF, HF, UHF) are used world wide, and depending on the application, the appropriate frequency is chosen. This is because LF, HF or UHF has its own strengths and weaknesses. Table 2 is an overview of available frequencies standards.

Generally, the standard technology used for livestock identification and managements systems is Low Frequency (LF – 134 kHz). However, the livestock industry is beginning to focus on UHF technology for animal tagging solutions, due its advantages in comparison to LF 134 kHz (table 3).

UHF Animal Tagging Projects

Within the last 18 months a volume of over 130,000 UHF Tags have and continue to be used in pig tagging projects conducted through out Europe.

All frequencies have strengths and limits

Tab. 2: Frequency and Standards

100 kHz	125–135 kHz	10 MHz	13,56 MHz	100 MHz	860–960 MHz	1 GHz	2,45 GHz	10 GHz
World Wide Standards (International Organization for Standardization – ISO)								
			ISO 11784 ISO 17845	ISO 15693 ISO 14443	ISO 18000-6C/Gen2			
			ISO 18000-2	ISO 18000-3				
Frequency Range			Low Frequency (LF) (125–135 kHz)	High Frequency (HF) (13,56 MHz)	Ultra High Frequency (UHF) (860–960 MHz)		Microwave (2,45 GHz)	
Read Range			< 70 cm	< 1 m	< 8 m		< 10 m	
Application			e.g. Animal Tagging	e.g. Libraries	e.g. Logistics		e.g. Toll Collection	
Multi Tag Reads (Bulk)	slow ‹							› fast
Ability to read in harsh environments (metal or wet surfaces)	good ‹							› challenge
Tag/Inlay size	big ‹							› small
Investment	high ‹							› low

Source: Purser

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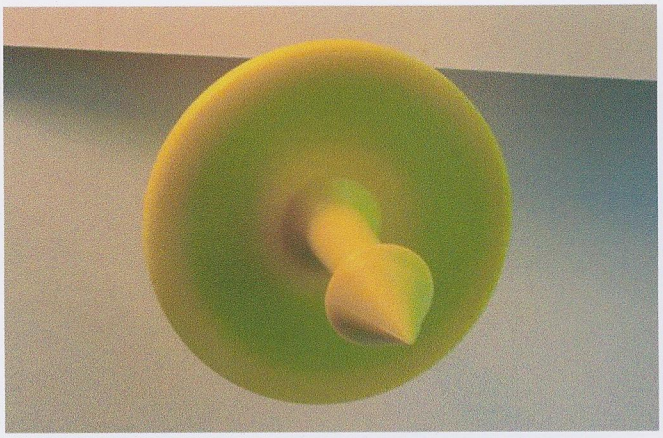
Tracking pork with RFID ear tags



The round shadow visible in the animal ear tag, is an embedded UHF inlay which is being used in European projects.

Many pig farmers are taking part in the big project.

A very positive factor is the high volume of pig farms who are participating in pilot projects, that way testing continues to be conducted under various field conditions involving the tagging of animals from a few weeks old until slaughter. The production sites vary in holding, workflow and environment. The enterprises pureSpekt and MS Schippers have embarked on a large scale roll out using Europe as its playing field to test its innovative UHF ear tagging technology.

To date it can be stated, that the read rate of UHF ear tags have exceeded expectations (close to 100% read rate) with a read distance of 2 m (approx. 6,5 feet - using 2W readers), in comparison to LF with 20–30 cm read distance.

Variables that have been, and are under further investigation, are for example the pigs' ear, where best to position the ear tag to achieve the best read, or how damaged or dirty a UHF tag can be, before it ceases to function. Bulk reading (reading groups of pigs in various numbers – in ms) is also an important element, which caused no concern either in the stall or in transit.

The RFID solution consists of UHF stationary (circular polarised) and mobile readers, UHF ear tags and software for data collection.

To summarise; development, production and tests are focused (and are still being carried out) on:

- Quality
- Robustness and size of UHF ear tags
- Read rate and read distance
- Loss of ear tags and tag damage
- Chip functionality in harsh environments (e.g. dirt, moisture, ammonia)

as well as closed and open loop systems i.e. tracing and tracking swine within one location, or various locations within the pigs life cycle in the meat producing eco system.

Livestock industry focussing on UHF

Tab. 3: UHF and LF technology

	Low Frequency (LF)	Ultra High Frequency (UHF)	Advantages UHF
Frequency	125-134,2 Khz	850-950 MHz	
ISO Standards	11784 / 11785	EPCglobal & ISO 18000-6C	
Memory Size	< 64 bit (not ISO)	< 512 bit	x
Coupling	Magnetic	Electromagnetic	x
Distortion	ok – Fluids	can be attenuated – Fluids	
Read Rate	< 10/second	< 300/second	x
– Read (R) – Write (W) – Overwrite (O) – Unique Identification (UID)	R/O, R/W	R/O, UID, R/W	x
Multi-Tag Read (bulk reading)	No	Yes	x
Read Distance	< 70 cm (mobile Readers 20–30 cm)	< 8 m (mobile Readers with 1W out put power – 3–5 m)	x
Costs	Tag < 2,00 € depending on volume	Tag < 0,60 € depending on volume	x

Source: Purser 2012

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In the Arab world **food in conformity with halal dietary laws,** due to religious reasons, is in high demand. Also in Europe, **halal products with fat replacers** show extraordinary growth. Apart from faith, the focus lies definitely on **economic aspects aswell.**

The use of **fat replacers,** which have been on the market so far, **cause significant loss in taste and appearance** in the final product. **From now on this belongs to the past.** A further technological masterpiece from the company's research and development center is **now available: Meat Cracks Emulsan ACP FF.**

- Fat replacer with neutral taste and optimum appearance
- To be used in coarse-grained Salami and semi-dry sausage
- In conformity with halal dietary laws
- Production without animal-based fat possible
- Use with water and/or vegetable oil
- High calculation reliability

We would be pleased to visit and provide you with further information aswell as to support you in the easy integration of Meat Cracks Emulsan ACP FF into your existing production process.

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At this moment and time, test results are still being collated and updated on a daily basis (a summary is expected in Q3), however what can be stated is that farms in the very near future will have access to affordable electronic UHF tagging systems that surpasses LF technology through speed, less administration, clean data, accuracy, brand building, investment and consumer satisfaction.

With UHF technology farmers will be able to focus on running their operation with less administrative tasks, a clear overview of their animals history and a reliable tracing and tracking system.

Benefits of RFID

It was not until December 2000, that through a directive (2000/15/EG) of the European Parliament, it was made law for EU countries to have central registry databases for porcine. The law was passed, to improve disease - management i.e. to prevent disease from spreading and swift eradication of infections.

The process of registering information starts as soon as a change occurs with the present swine holder e.g. farmer, live stock carrier, livestock trader and slaughterhouse.

Minimum Information (some countries register additional information to the minimum requirements by EU legislation) that needs to be registered from each party:

- the companies registration number and address
- type and category of company (e.g. farm, trader, carrier)

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- name of responsible person for the animals and address details
- the amount of pigs taken over and date from the previous owner
- the registration number of the company the pigs were taken over from
- every year on January 1 number of pigs in holding

The system put in place by the EU parliament is an excellent framework to continue developing on. At the moment traceability of swine is generally limited to pig holdings (not in all countries).

However with quality standards rising, the fear of contaminated food, production efficiency (CO_2) and resources management, consumers and commerce wish to be informed in far more detail on the product which is being purchased than the consumer 10 years ago.

A further point to consider, are the complex international intertwining global agricultural networks, and trade partners having to fulfill and implement by European law, food safety obligations and conditions.

The advantages to have an automated tracing and tracking system in place, that identifies the individual animal broken down into its constituent parts, are numerous:

The meat production and retail industry will for e.g. have improved visibility, real-time data, improved stock management, facilitate product recalls in the event of a contaminated batch, brand protection, quality improvements, customer satisfaction, customer loyalty, consumer protection and improved crisis management.

The consumer will enjoy peace of mind, stay in good health and be a recurring customer.

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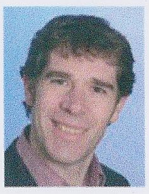
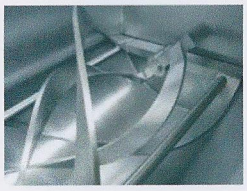
Charlie Purser, pureSpekt's CEO holds a Postgraduate Diploma and BSc in Psychology. Within the last 10 years he has worked for International Corporates with the responsibility for RFID Business Development in Europe, Middle East and Africa (EMEA).



Inotec

Mixing and trimming ham

The introduction of the Vario Mix Technique of Inotec GmbH from Reutlingen, Germany, in the field of production of cooked ham lead to a reduction of the processing times. This technology can be applied for molded hams with small trimmings or ground meat and also for high value cooked ham with complete ham pieces. A quick, gentle and universal mixing action is reached by the Inotec Vario Mix technology. The geometry of the Inotec Vario Mix consists of two interacting spirals without central shafts which are moving in opposite directions. The relation of speeds between interior and exterior spiral is adjustable. For an aggressive mixing action (for example for molded ham) and for a quick discharge both spirals can move in the same direction in order to move the product against the narrow mixer wall or towards the outlet. By working in opposite directions the product pieces are gently moved against each other and only have minimum contact with the mixer walls. The vacuum level is adjustable and mixing times are depending on the product and the injection quantity are between 15 to 90 min. and according to customer's requirement the product can be filled and cooked directly.



Even big meat pieces are treated carefully without destruction.

www.inotec-gmbh.de

World Pac

Smoking without a smokehouse

Sun Smoke CAS of World Pac International AG from Balzers, Fürstentum Liechtenstein, are high barrier casings impregnated with liquid smoke on the inside. While processing, the liquid smoke is transferred to the outside of the final product and gives a smoke taste and a nice smoke colour rind, without bleeding in. With this product, additional smoking is not necessary anymore; this reduces the smokehouse hours. Sun Smoke CAS also provides producers without a smokehouse the possibility to produce now smoked products the easy way. With the casing the user achieves a higher flexibility, and the use is safe and environmentally friendly. As the casings are high barrier, guaranteeing a longer shelflife of the final products. They are available from FW 42,5 mm up to FW 300 mm as shirred strands, on reels or as cut pieces. They are available as clear as well as coloured casings. At the moment 15 smoke profiles of Sun Smoke CAS are available. This CAS product line is now completed with the new flatfilms for use in production on Polyclip-TSA and -TSCA lines. The flatfilms impregnated with Smoke increase the productivity dramatically as they are online-tape-sealed in the customers' facility.

The casing is impregnated with liquid smoke on its inside.

www.worldpac.li