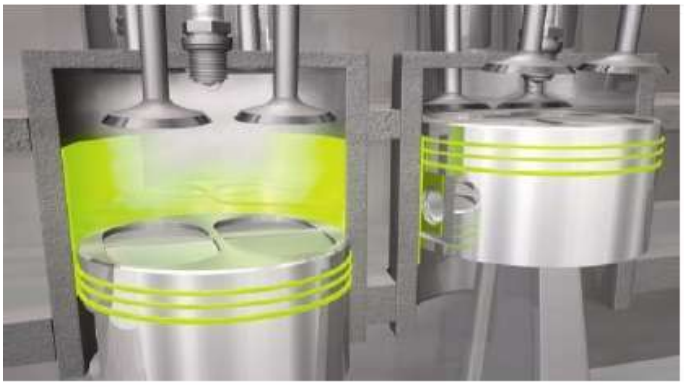
Nanotechnology & The Food Sector

Having spent 16 years in the fresh produce sector, running Farmer's Pride from New Covent Garden Market, London, I was fortunate to get the opportunity to spend the following 16 years working in emerging technology, specifically nanotechnologies.

Given that experience, how would innovations in nanotechnology help the fresh product sector today?

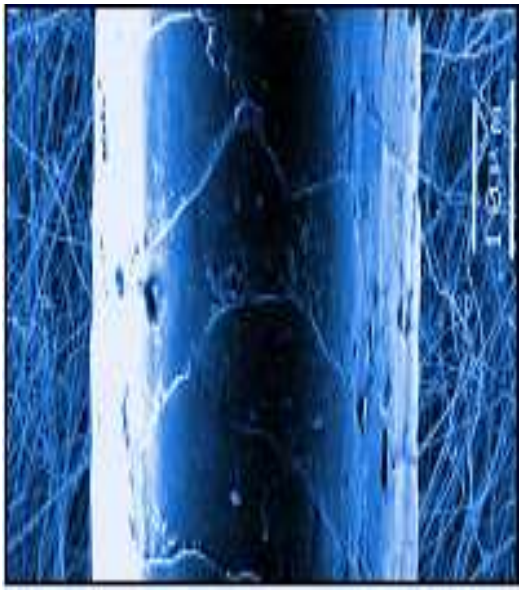
Nanotechnology is not a specific technology, but a multidisciplinary toolbox enabling enhancements to almost every business and organisation.

Let's start with Transport. At Farmer's Pride we had a small transport fleet of 13 vehicles. We had no idea then that it was possible to reduce our fuel use by 11%, or to reduce our vehicle wash cycles by 50%. Nowadays we can simply make vehicle engines much more efficient by adding a ceramic nano coatings to the engine, (not a oil additive) so that engine wear stops and engine efficiency and power are maximised.



Environmental issues were not so hot two decades ago, but now using nanotechnology we can reduce diesel soot by 70%, and lower maintenance costs significantly. We can even place a "nanoglue" into vehicle tyres, preserving the correct tyre pressure for the life of the tyre and preventing punctures. Great! No more punctures! Correct tyre pressure reduces fuel burn and increases tyre shelf life, in addition to making vehicles safer on the road.

Keeping vehicles new looking and clean every day is good for Brand and compliance. Using nanotechnology, we can seal the vehicle body-work, (windscreen and wheel-arches included) with a invisible thin film coating (50, 000 times thinner than the diameter of a human hair), which will cause a self-cleaning effect, keeping the paintwork sealed and vehicle new looking for the life of the asset.



Human Hair compared to nano wires in background

In fact windscreens can be made safer for night driving in rain, using these nano-coatings. Washing cycles can be reduced by 50%, water usage by 40% and aggressive cleaning chemicals by 100%. The business wins financially and environmentally and the warehouse, prep-rooms and cold store units can all be coated to deflect dirt and bacteria. Thus the food working environment is looking better, cleaner, safer at less cost.

These thin film coatings and varnishes can add compelling value to fridges and refrigerated trucks also. By coating a wall of a fridge with a nano-coated solution, insulation is increased by up to 40%, without adding major weight. Imagine the savings if every refrigerated truck on the road today was aware of this simple fuel saving insulation technology!

Light efficiency and energy costs can be high too. Nanotechnology is under trials at London Underground to help keep tube lighting free of dirt and soot. Hygiene maintenance costs for one bulb can amount to between £600 to £1000, and when you have 3m to 4m units to clean every six months, costs can become extortionate. These trials have shown that light reflectors can also be enhanced to deflect better light, without additional energy.

Packaging can be enhanced using nanotechnology. It is generally the case that mushrooms etc are packaged in plastic, because if one uses cardboard, the moisture from the mushroom is extracted by the cardboard, causing damage and soiling to the mushroom. However plastic is an environmental negative. By coating the cardboard with nanofluids, one can make cardboard act like plastic with nominal costs. Indeed, a nano-trial will soon start to block the negative effects of cancerous ink seepage from recycled paper and thus cardboard boxes.

Imagine if every plastic or wood pallet in circulation was nano-coated to kill bacteria, and protect the asset itself.

The REACH regulations have impacted the organic grower, removing many chemicals that hitherto were considered toxic to man and beast.

Again nano technologies are offering new possibilities to add bio-friendly coatings that repel insects and rodents alike. Tests are underway using nanotechnology to show better ways to repel red mite in poultry farms, to preventing hares, rabbits, rodents and deer digesting valuable vegetation.

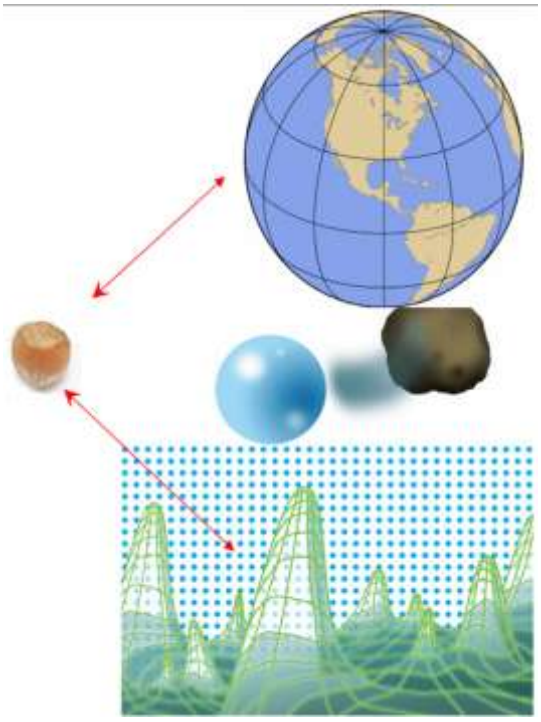
Every surface can be enhanced and protected using nano smart fluids. Food processing units: walls, roofs, fat filters, staff uniforms, boots, every surface area can be made mildew and bacteria repellent or easy clean. Fabrics and textiles can be stain-proof, high-visibility jackets dirt repellent, conveyor-belts antimicrobial. Food companies can reduce the amounts of cleaning time and aggressive chemicals deployed, helping reduced costs and becoming more Green.

Any food company producing biodegradable waste can now economically turn that waste into good quality fertilizer or pellets for energy creation. Waste is now a asset.

Often where food is processed, water is deployed, causing a risk to electronic machinery like weighing scales, lights, computers and fridges. Again nano-varnish coatings can protect all electronic cabling and equipment from moisture, water and dampness, and protect against corrosion and electrical problems.

The ratio of a nanometre to a metre equals the ratio of a hazelnut to planet Earth

The coatings we are going to present here are as thick as a few layers of molecules



Perhaps one of the greatest inventions still awaiting exploitation by the food sector is the fact that every item within the food sector that has a solid, non reflective surface carries a unique ID!

Forget the costs of RFID and Barcodes! Every piece of paper, cardboard, plastic, any solid structure at the molecular surface level , has a unique topography which can be scanned by standard radar scanner and thus fed into a database. It is seemingly impossible to recreate that nano signature, so this innovation insight should solve all counterfeit and traceability issues forever!

Perhaps soon you will scan that Toulouse Sausage and see if it came from Leeds!

Companies need to be awake to the massive opportunities now unfolding via nanotechnologies. Soon we will have an entire new concept of aroma emitting food labels, electronics that repair and deliver services, energy storage on a pinhead, medical cell repair and disease prevention, rather than cure. Even established industries like coal mining are starting to innovate and learn how to make poor quality coal burn better than anthracite with zero emissions. Soon perhaps the unproductive dessert will hold water and cultivate crops. Watch this space.

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