

# PULSED ELECTRIC FIELDS TECHNOLOGY FOR THE FOOD INDUSTRY FUNDAMENTALS AND APPL

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**What are the applications of pulsed electric fields technology for the food industry?** Summary. PEF treatment is used in the food industry for the targeted disruption of membranes of biological cells and microorganisms. It facilitates the mass transport of cell water as well as valuable substances from the cells. This benefits the potato and vegetable industry in terms of processing and product quality.

**What is a pulsed electric field in food processing?** Pulsed Electric Field (PEF) processing is a non-thermal food processing method that utilizes short, high-voltage pulses. These pulses facilitate poration in plant, animal, and microbial cells, which leads to cell disintegration and microbial inactivation. PEF is instantaneous, precise, adaptable, and energy-efficient.

**Why is PEF not used more in the food industry?** These reactions, especially those leading to corrosion and fouling of the electrodes, electrolysis of water, migration of electrode material components, and chemical changes of food product, must be minimized, since they may affect PEF commercialization through safety, quality, process efficiency, equipment reliability ...

**What is the voltage of PEF?** PEF is a method that uses electric waves with high voltage amplitude. Short electrical impulses (from microseconds to milliseconds

each) of high voltage (typically 10–80 kV/cm) are supplied to the product placed between the electrodes in the chamber (Deeth et al.

**What are the disadvantages of pulsed electric field processing?** In addition, PEF also has its disadvantages which include the reversibility of the membrane changes, air bubbles making the process less effective, and the efficiency of the method depending on electric field strength and electrode gap (Joannes et al.

**How does PEF technology work?** How does PEF technology work? Every cell (membrane) contains +/- ions. By adding electric power between two electrodes, an electric field is created on the +charge which hence repels and pulls the + and – ions respectively. This, therefore, adds to increase membrane permeability or cell lysis.

**What are the benefits of pulsed electric fields?** PEF's ability to retain essential nutrients like vitamins, antioxidants, and pigments results in products that are not only healthier but also appear fresher and more appealing. This process operates at significantly lower temperatures compared to traditional heat pasteurization methods.

**What is PFR in food?** must obtain a Processed Food Registration (PFR) from FDB. A PFR certificate is a firm's basic health permit. The PFR allows firms to manufacture products not specifically covered by another FDB license. PFR certificates are also required for general food warehouses.

**What is PEF in potato processing?** PEF-induced permeabilization of cell membranes leads to tissue softening and enhanced mass transport. This results in improved potato cutting, higher product quality, and increased process capacity.

**What are the pros and cons of PEF?** Pros of Polyethylene furanoate (PEF) include sustainability and low cost from lignocellulosic biomass waste. Cons may involve further research needed for biodegradability, microplastics generation, and process optimization. Bottle-grade polyethylene furanoate from ring-opening polymerisation of cyclic oligomers.

**Is PEF biodegradable?** “And it demonstrates that PEF degrades significantly faster than PET. We don't see this as an end-of-life solution, and we are focused on recycling of PEF.” Van Aken says the company is not trying to market PEF as a biodegradable solution. However, it will not accumulate in nature like PET.

**What is PEF food safety?** Firstly, PEF is a non-thermal preservation technique that can extend the shelf life of food products, reducing food waste and loss. By keeping food fresh for longer, PEF can help reduce the need for energy-intensive refrigeration and transportation.

**What is a normal PEF value?** The expected values are higher in younger people, taller people and men. Peak expiratory flow (PEF) is measured in litres per minute. Normal adult peak flow scores range between around 400 and 700 litres per minute, although scores in older women can be lower and still be normal.

**What does high pef mean?** It measures the airflow through the bronchi of the lungs and thus the degree of obstruction in the airways. Peak flow readings are higher when we are well, and lower when the airways are constricted.

**How is PEF done?** Peak flow measurement can show the volume and rate of air that can be forcefully breathed out of the lungs. The measurement should be started after a full lung inhalation. During the test, you blow forcefully into the mouthpiece of a device.

**What is the application of pulsed light in food processing?** Pulsed light (PL) is a food processing technology in which intense, short-duration pulses of white light are used to kill bacteria on food, food contact surfaces, and packaging.

**What is the application of PEF technology in food processing and human nutrition?** Research on the applicability of PEF in food processing suggests that PEF can be used alone or in combination with other methods, not only to inactivate microorganisms and extract active constituents, but also to modify biomacromolecules, enhance chemical reactions and accelerate the aging of fermented foods, which are ...

**What are the industrial applications of pulsed power technology?** Pulsed-power technology is a solution for sterilization, food processing, water treatment, waste purification, and surface treatment applications. Development focuses on addressing longevity in industrial applications, reliability, size, consistent power, and frequency repetition challenges while delivering higher ...

**What are the applications of biosensors in food industry?** Through enzymatic and immunogenic reactions, biosensors can be used to determine the level of pesticides, antibiotics, proteins, vitamins B complex and fatty acids found in foods. Figure 1.1 depicts the different applications of biosensors used in food industries.

### **Toolbox Meeting Guide: Empowering Safety on the Job**

A toolbox meeting is an essential safety tool that allows teams to discuss hazards, review safety protocols, and address any concerns related to their work environment. Here's a guide to help you conduct effective toolbox meetings:

#### **1. Preparation:**

- **Frequency:** Determine the frequency of meetings based on project complexity and risk factors.
- **Attendees:** Ensure all team members are present, including project managers, supervisors, and workers.
- **Location:** Choose a convenient location with minimal distractions and sufficient space for group discussion.
- **Materials:** Gather necessary materials, such as safety data sheets (SDSs), tool checklists, and personal protective equipment (PPE).

#### **2. Introduction and Ice Breaker:**

- Start by introducing the topic of the meeting and its importance for safety.
- Consider an ice breaker activity to engage the team and foster open communication.

#### **3. Hazard Identification and Risk Assessment:**

- Discuss potential hazards associated with the task or project.
- Analyze the risks of each hazard and determine appropriate controls to mitigate them.
- Involve team members in the discussion to gather their insights and perspectives.

#### **4. Safety Protocols and PPE:**

- Review safety protocols related to the work activity, including proper use of tools, equipment, and PPE.
- Ensure team members understand the importance of following these protocols.
- Discuss any PPE requirements and ensure proper fit and use.

#### **5. Open Discussion and Action Steps:**

- Encourage team members to raise any concerns or questions regarding safety.
- Address concerns promptly and develop action steps to resolve them.
- Assign responsibilities and set timelines for implementing the action steps.
- Document the meeting and distribute minutes to all attendees.

### **Reclaiming Mind, Body, and Spirit through the Chakras with "The Sevenfold Journey"**

**Introduction** "The Sevenfold Journey: Reclaiming Mind, Body, and Spirit through the Chakras" by Judith Anodea Vega is a comprehensive guide to the seven major chakras. Through a combination of ancient wisdom and contemporary insights, Vega offers a transformative approach to healing, self-discovery, and spiritual evolution.

**Q1: What are the seven chakras?** A1: The chakras are seven energy centers located along the spine. Each chakra corresponds to a specific color, element, and archetypal quality. They are: Root (red, earth, survival), Sacral (orange, water, creativity), Solar Plexus (yellow, fire, power), Heart (green, air, love), Throat (blue, ether, communication), Third Eye (indigo, intuition), and Crown (violet, spirit, connection).

**Q2: Why are the chakras important?** A2: The chakras regulate the flow of energy throughout the body. When they are balanced, we feel healthy, vibrant, and connected to ourselves and the world. When they are blocked or out of balance, we may experience physical, emotional, and spiritual problems.

**Q3: What is the "Sevenfold Journey"?** A3: The "Sevenfold Journey" is a seven-step process that helps us to identify, clear, and balance our chakras. Through meditation, visualization, and other practices, we can release old patterns, heal wounds, and reclaim our innate potential.

**Q4: What are the benefits of balancing the chakras?** A4: Balancing the chakras can lead to numerous benefits, including:

- Improved physical health and vitality
- Increased emotional stability and well-being
- Enhanced creativity and intuition
- Deeper spiritual connection and purpose
- Greater self-awareness and self-love

**Conclusion** "The Sevenfold Journey" by Judith Anodea Vega is an invaluable resource for anyone seeking to deepen their connection to themselves and to the world. Through the exploration of the chakras, we can unlock our true potential, heal old wounds, and create a life filled with purpose and meaning.

## **The 36 Ancient Chinese Strategies for Modern Business**

### **What are the 36 Ancient Chinese Strategies?**

The 36 Ancient Chinese Strategies are a collection of tactics and principles derived from the ancient Chinese military treatise "The Art of War" by Sun Tzu. These strategies offer insights into effective leadership, competitive advantage, and business decision-making.

### **How can these strategies be applied to modern business?**

The strategies provide a timeless framework for navigating complex business challenges. By understanding and applying these principles, business leaders can gain a competitive edge and achieve success. For example, the strategy of "attacking the enemy's weak points" can be used to target vulnerable areas in a competitor's business plan.

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**What are some examples of these strategies?**

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Some key strategies include:

- Attacking the enemy's weak points
- Befriending the enemy's friends
- Turning disadvantage into advantage
- Creating chaos and confusion
- Seizing the initiative
- Adapting to changing circumstances

### **How can these strategies help businesses succeed?**

By applying these strategies, businesses can:

- Outmaneuver competitors
- Identify and seize opportunities
- Manage risk and uncertainty
- Build strong relationships
- Achieve sustainable growth

### **Why are these strategies still relevant today?**

Despite being centuries old, The 36 Ancient Chinese Strategies remain relevant today because they address fundamental principles of human behavior and competition. By understanding these principles, businesses can navigate complex and dynamic markets, adapt to changing conditions, and achieve long-term success.

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