Yves HÉNON
INTERNATIONAL IRRADIATION ASSOCIATION

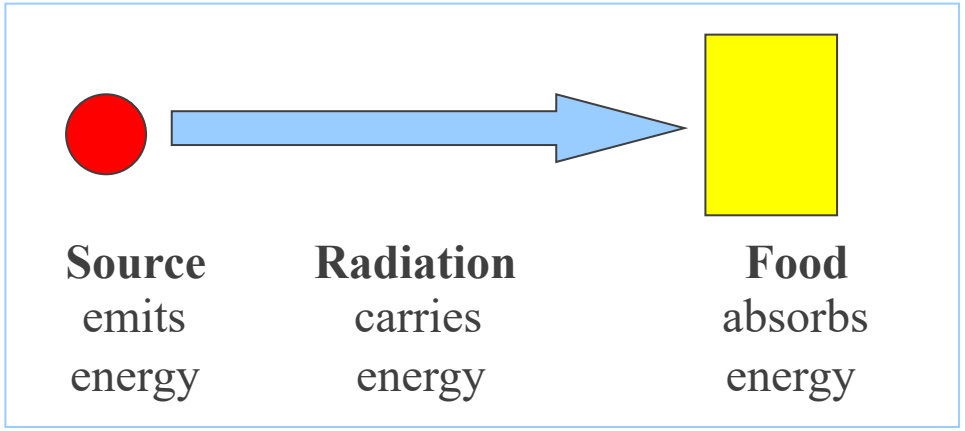
Food irradiation

Global market situation

FOOD IRRADIATION

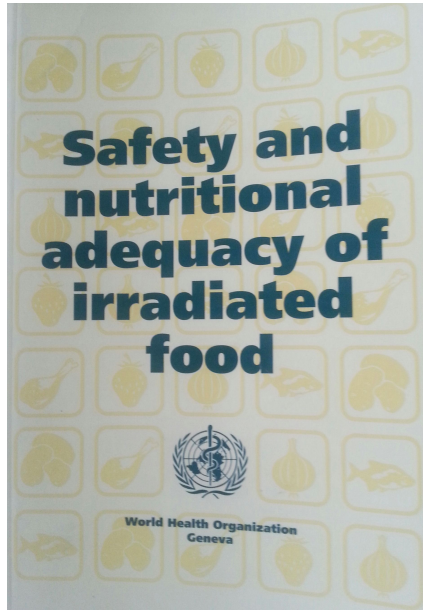
Exposure of food to ionizing radiation

Transfer of energy



Physical process *regulated as a food additive*

IRRADIATED FOOD IS SAFE



Does not make food radioactive

No particular toxicological, microbiological or nutritional problem

Safety more extensively researched than for any other process

Changes minimal: not easy to tell if a food has been irradiated

U.S. Department of Health and Human Services

FDA U.S. FOOD & DRUG ADMINISTRATION

Is Irradiated Food Safe to Eat?

The FDA has evaluated the safety of irradiated food for more than 30 years and has found the process to be safe. The World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC) and the U.S. Department of Agriculture (USDA) have also endorsed the safety of irradiated food.

POTENTIAL BENEFITS OF FOOD IRRADIATION

IMPROVE FOOD SAFETY

Replacement of harmful chemicals
Inactivation of foodborne pathogens

IMPROVE BIOSAFETY

Prevents spreading of invasive pests

REDUCE FOOD WASTAGE

Improvement of microbiological quality
Extension of shelf life

IMPROVE FOOD SECURITY

Reduction of post-harvest losses

CONSUMERS' PERCEPTION

WHAT DO CONSUMERS THINK OF FOOD IRRADIATION ?

DO CONSUMERS BUY IRRADIATED FOOD ?

YES WHEN

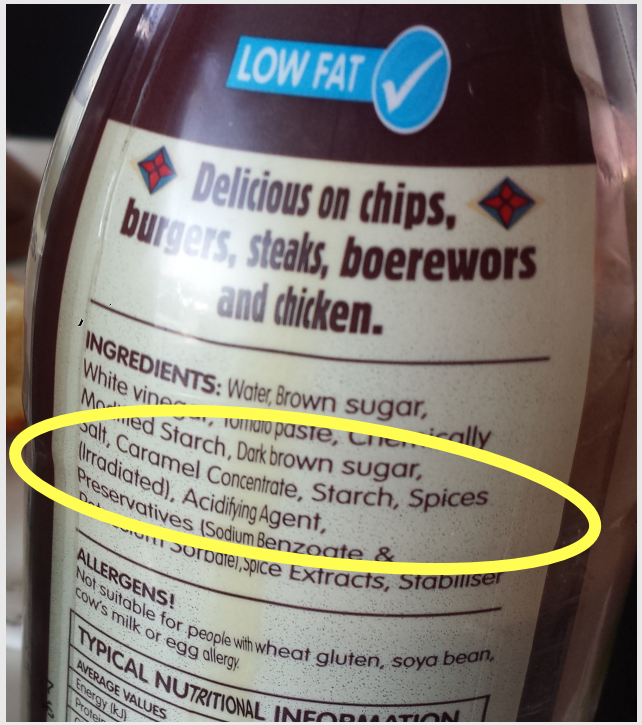
1) REGULATORS ALLOW THEM
2) RETAILERS OFFER THEM

Mention of irradiation on label mandatory

INFORMS?

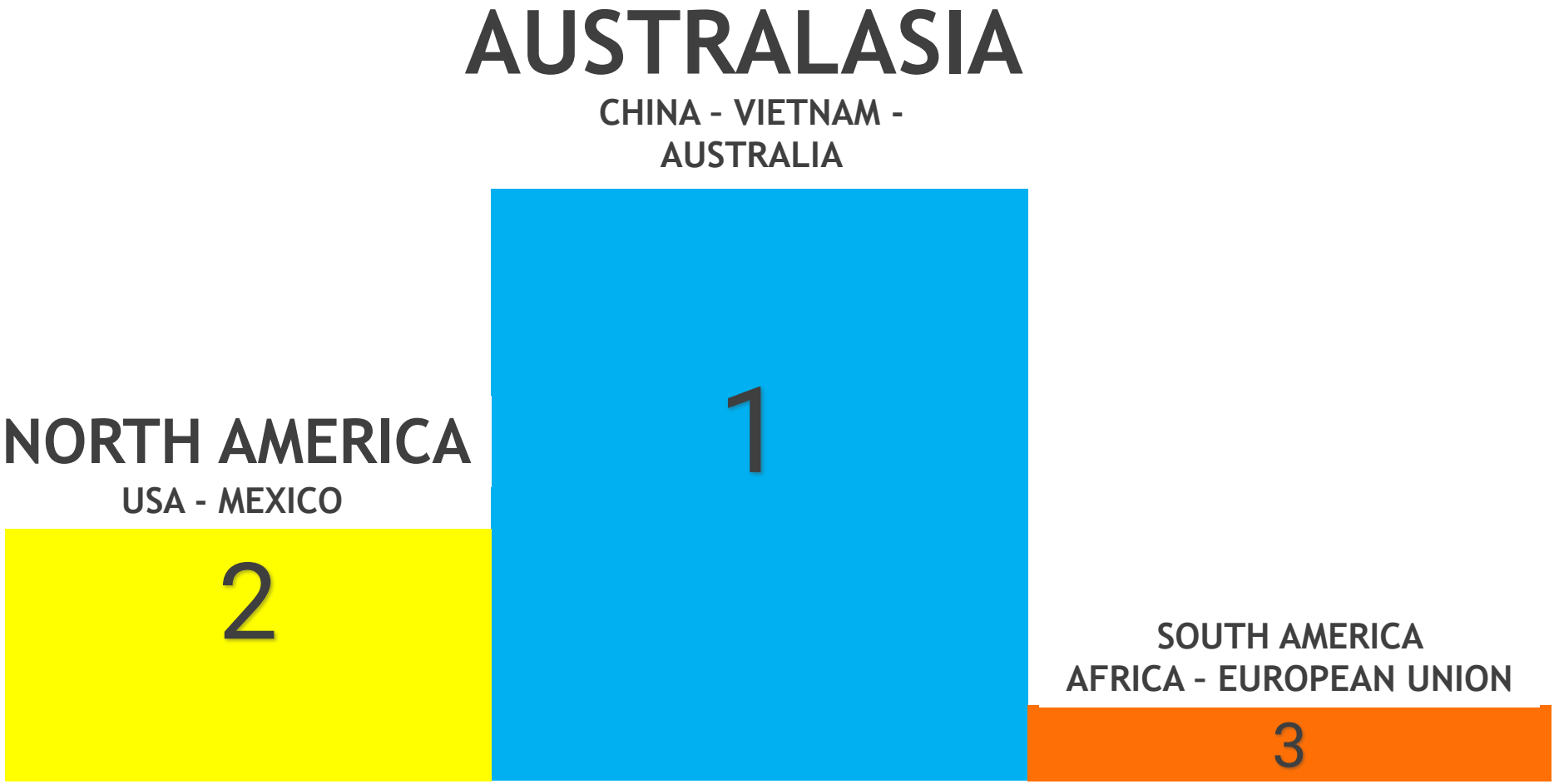
OR

MISLEADS ?

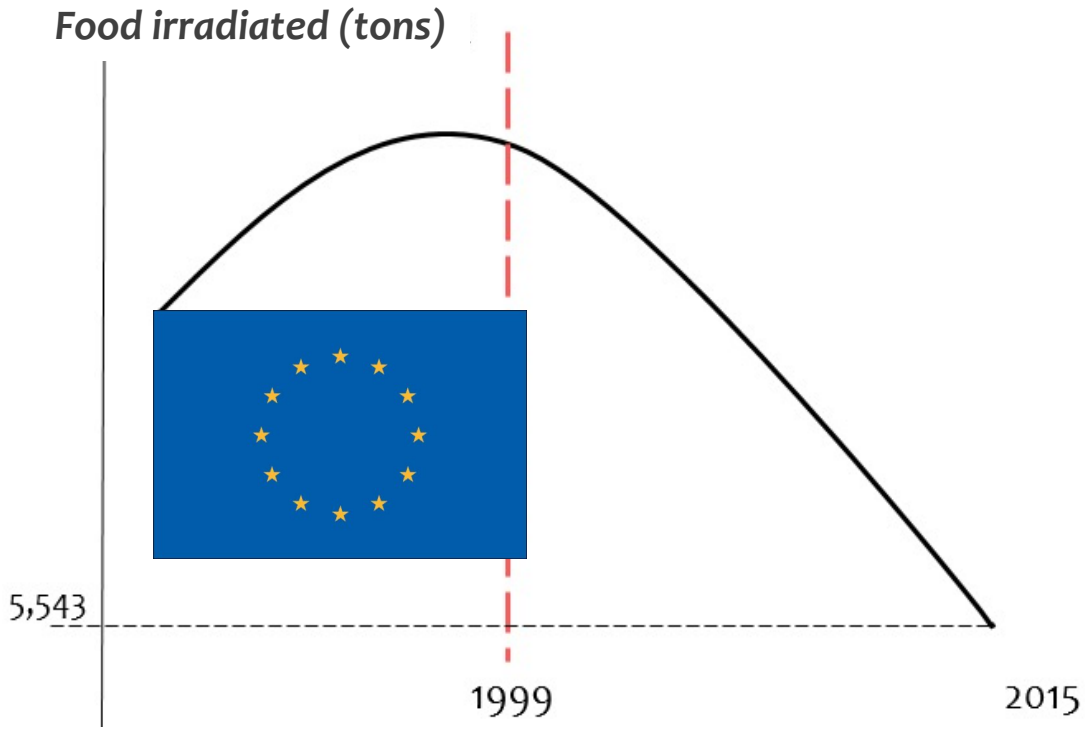


The RADURA logo

COMMERCIAL USE OF IRRADIATION FOR FOOD



EUROPEAN UNION



Volumes of irradiated food culminated at about 80,000 tons in 1998

1999 Directives permitted irradiation of spices and herbs only + a few national authorizations remained

Irradiation must be mentioned in list of ingredients for any amount

Directives retrospective evaluation currently in progress may not result in any significant evolution

AFRICA

Significant use :

- Egypt: Spices

- South Africa: Spices
  Imported honey
  Freshly lifted garlic, onion, ginger
  Table grapes, persimmons (export)

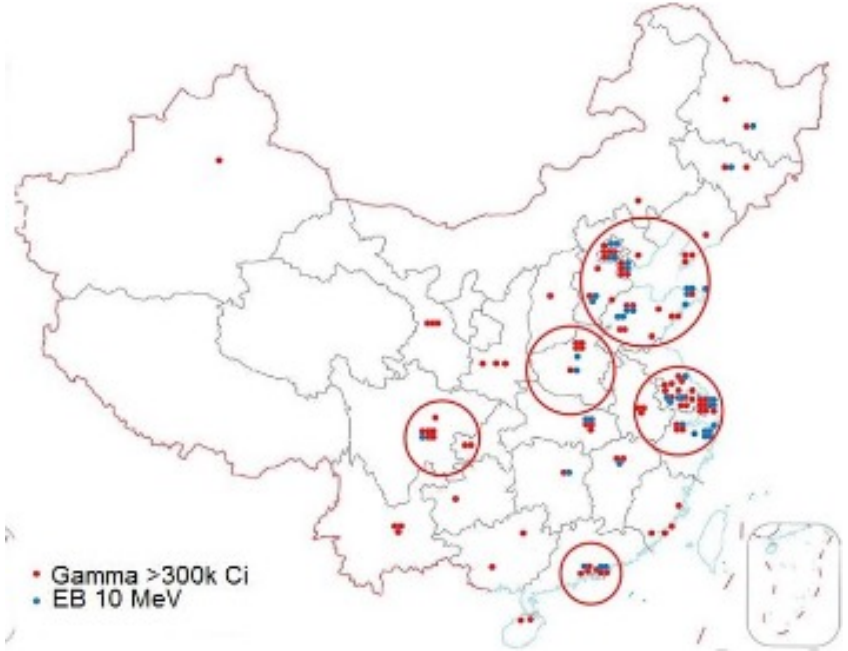
Irradiation capacity limited
Other more sustainable technologies appear more needed and better suited than irradiation to improve food security in developing countries

CHINA

NUMBER 1 USER:

> 1 million tons of food irradiated

in ~ 100 gamma and electron beam irradiation facilities



CHINA

Largest volumes:

- Spices, condiments, sauces

  > 250,000 tons / year

Irradiated seasonings in instant noodles

Dehydrated vegetables and spices are irradiated according to international procedures

- Garlic
  (China world # 1 producer and exporter)

- Pickled chicken snack

CHINA

Spicy pickled chicken feet / wings:

- Popular snack found in convenience stores across China.
- Irradiation allows minimum boiling for better texture
- Shelf-life at room temperature > 6 months
- 350,000 tons irradiated in 2018
- Two major manufacturers have own irradiator

irradiated

JAPAN

Permitted sprouting inhibition for potatoes

Built potato irradiation in 1973
Now ~ 6,000 tons / year

No new regulatory / commercial development in 45 years

Potential of low-energy electron beams (*soft electrons*) for food explored since the 1990s.

VIETNAM

- Large irradiation capacity in multipurpose service centres

- Spices and seasonings, frozen fish and seafood, dried fish, etc. > 100,000 tons yearly
- Growth of phytosanitary irradiation accompanies rapid expansion of fresh fruit exports

In 2019, 5,100 tons of irradiated dragon fruit, dragon fruit, rambutan, longan, lychee, star apple, and mango to USA and Australia.

THAILAND

- Large irradiation capacity
- Spices and seasonings
- Spicy fermented pork sausage *“naem”* consumed uncooked, irradiated for safety

  Snack sold in convenience stores across the country

- Tropical fruit (mango, mangosteen) exported to USA and Australia. Imports irradiated table grapes from Australia.

INDIA

Irradiation permitted for a broad range of products

20+ multipurpose gamma irradiators of which most treat modest volumes of spices and seasonings

3 gamma irradiators approved by USDA-APHIS for phytosanitary treatments

1,200 tons of mangoes exported to the US in 2019

AUSTRALIA

Spices and seasonings

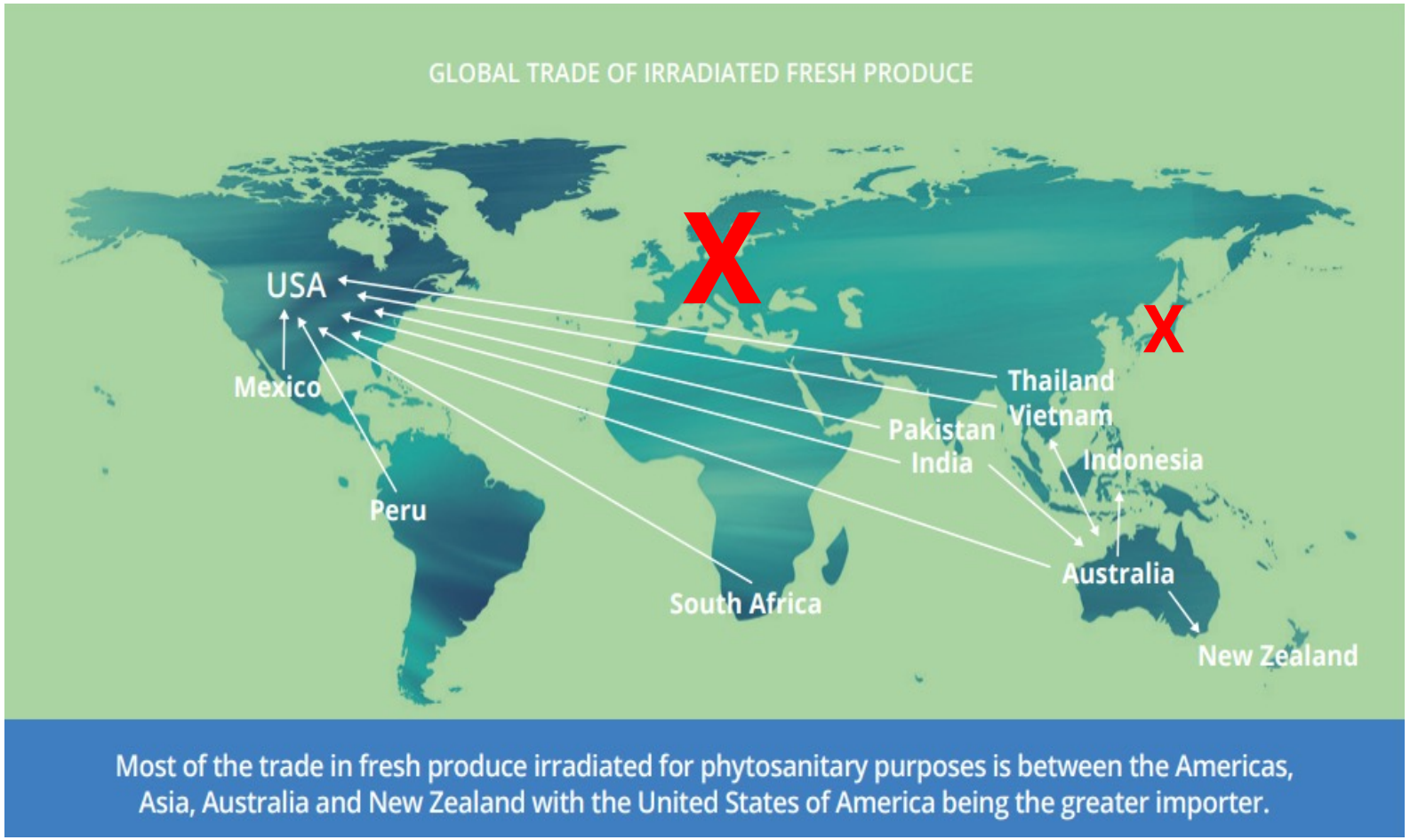
Strict biosafety rules + ban on certain fumigants triggered use of irradiation as a phytosanitary measure. Strong government support.

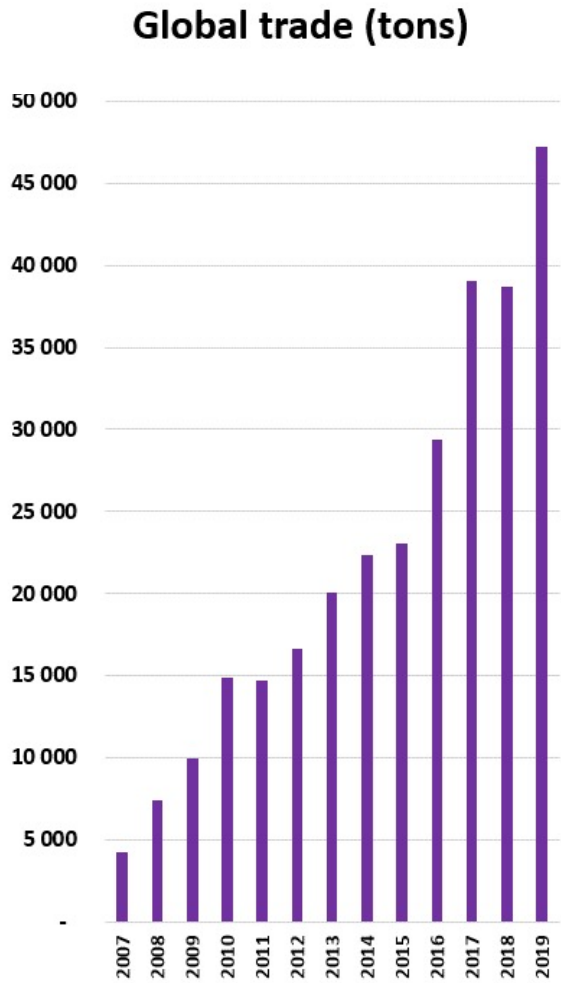
Now second exporter of irradiated fresh produce after Mexico

Table grapes, mangoes and other fruit exported to New Zealand, USA, Thailand, Indonesia

Use of phytosanitary irradiation increasing

Trade of irradiated fresh produce





WRAP-UP & OUTLOOK

Slow uptake of irradiation as a food process

Niche applications – Potential remains largely untapped

Phytosanitary irradiation shows again acceptance of irradiated products

Regulators and retailers might be the real obstacle to wider adoption

Unusual food technology as it is usually applied off-site in third party facilities

Electron beam and X-ray machines that can be easily integrated in manufacturing or packing line might change the food industry's view on irradiation

Thanks.

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