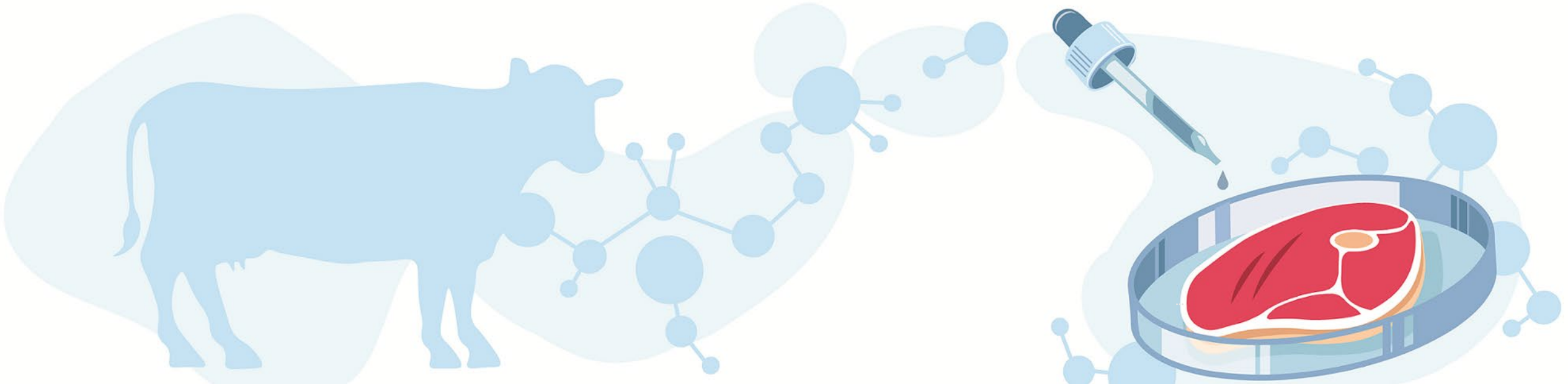
Food and Agriculture Organization of the United Nations

SUSTAINABLE DEVELOPMENT GOALS



Food safety aspects of cell-based food: Global perspectives

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Cell-based food production and food safety
© FAO available at https://youtu.be/YyUoP2d3Zos

What is it?

- Cell-based food products uses cell culturing techniques to develop muscle / fat tissues from various animal species. It can also be applied to plants.
- Production processes can siginificantly vary from one another.
- A high-level understanding of the production process can be in 4 phases:
  1. Cell sourcing
  2. Cell production
  3. Harvesting
  4. Processing

What's in a name?

What would you call it?

Cultured meat, cultivated meat, lab-grown meat, clean meat, fake meat, synthetic meat, cell-based meat, etc.

How about the commodity name use? Can we use "meat" or "salmon" for these products?

And…

There are more than 6,500 languages exist – what do we do about the translated terms?

Does "cellular agriculture" make sense to you?

Photo credit: © Aleph Farms

Mice no words – terminology matters

- One global literature synthesis and one nation-wide study on nomenclature were referred.
  - No term that is 100% scientifically accurate
  - Better to find a single less-confusing (differentiations, allergy issues), relatively over-arching and relatively well-accepted (by consumers) term
- Working terminologies for the FAO: cell-based food products/production
- While internationally harmonized terminologies are ideal, country contexts and languages need to be considered

“Futuristic” products?

It sounds ”futuristic” but they are commercially available in at least 2 countries

Cell-line development is done in the laboratory setting.

But the production is taking place in the food production facility, not in the lab.

Equipment, materials, and inputs may be “new” to the food production arena

But the food safety assurance measures for the production steps are similar to the ones for conventionally produced foods.

And they are not only meat products.

Photo credit: © Eat Just

Photo credit: © WildType

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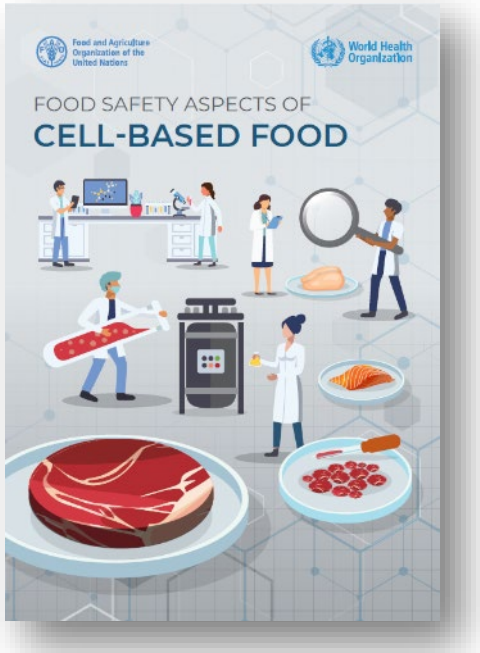
Why should food safety come first?

- "If it isn't safe, it isn't food."
- If safety is not assured, there is no point of discussing the potential benefits of the products.
- Food safety is an **enabler**, not a barrier.
- If food safety is neglected / underestimated, these products will not have a future.

Provision of Scientific Advice (ad hoc scientific advice)

Food safety aspects of cell-based food



https://bit.ly/40PgOwG

2021

Calls for experts / data

Identifying regulatory collaborators, partners, expert group, authors for the technical papers

Technical document development

Literature syntheses on terminologies, production processes, regulatory frameworks, and country case studies

2022

Stakeholder roundtable

One day global meeting to discuss with cell-based food researchers and developers on the food safety assurance issues as well as relevant communication issues

WHO joined FAO here

Expert consultation

3.5-day physical meeting to focus on food safety hazard identification of cell-based food production

2023

FAO/WHO Global dissemination

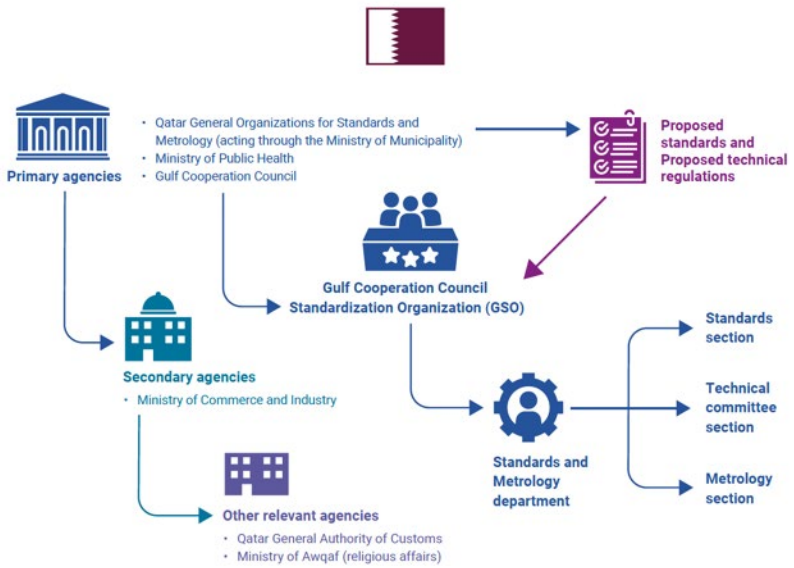
Webinar
Media interviews
Conference contributions

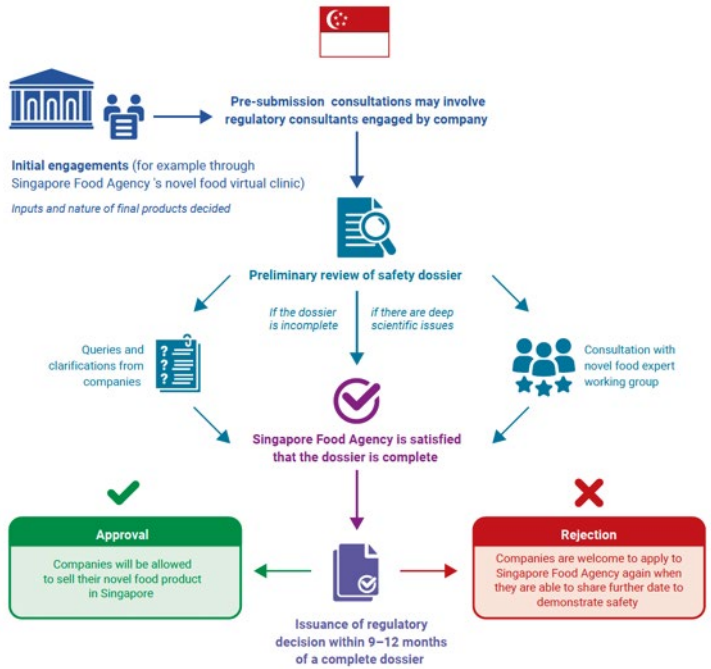
FAO Technical working group

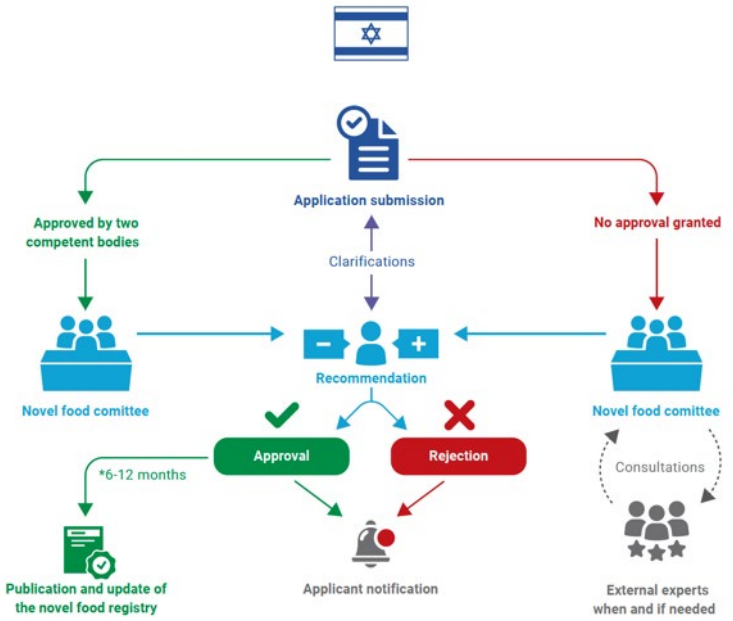
- Informal group active since Feb 2021
- Regulatory experts from public sector
- 35+ regulatory experts / 13+ countries and jurisdictions, 16+ agencies
- TWG shares the issues they are facing, activities they are conducting
- TWG informs FAO of their wishes for international organization’s actions
- Wide variety of topics covered: Cell-based food and precision fermentation included
- WHO has joined this TWG in June 2023

Literature Synthesis

1) **Terminologies**
   - All the relevant terminologies collected
   - Sector-based use analyzed
   - Not to pick “popular terms” but to lay out the facts
2) **Production process**
   - Very high-level overviews
   - Production steps identified for the purpose of food safety hazard identification
3) **Regulatory frameworks**
   - State of the art as of June 2022
   - Not so many countries are “ready”







3 Country case studies

1) Israel
2) Qatar
3) Singapore

Stakeholder round table

Discussion on the latest development

Exchange knowledge on food safety assurance

Various production processes to be presented for the food safety hazard identification process

Brainstorming relevant communication strategies

Hazard identification (Expert Consultation)

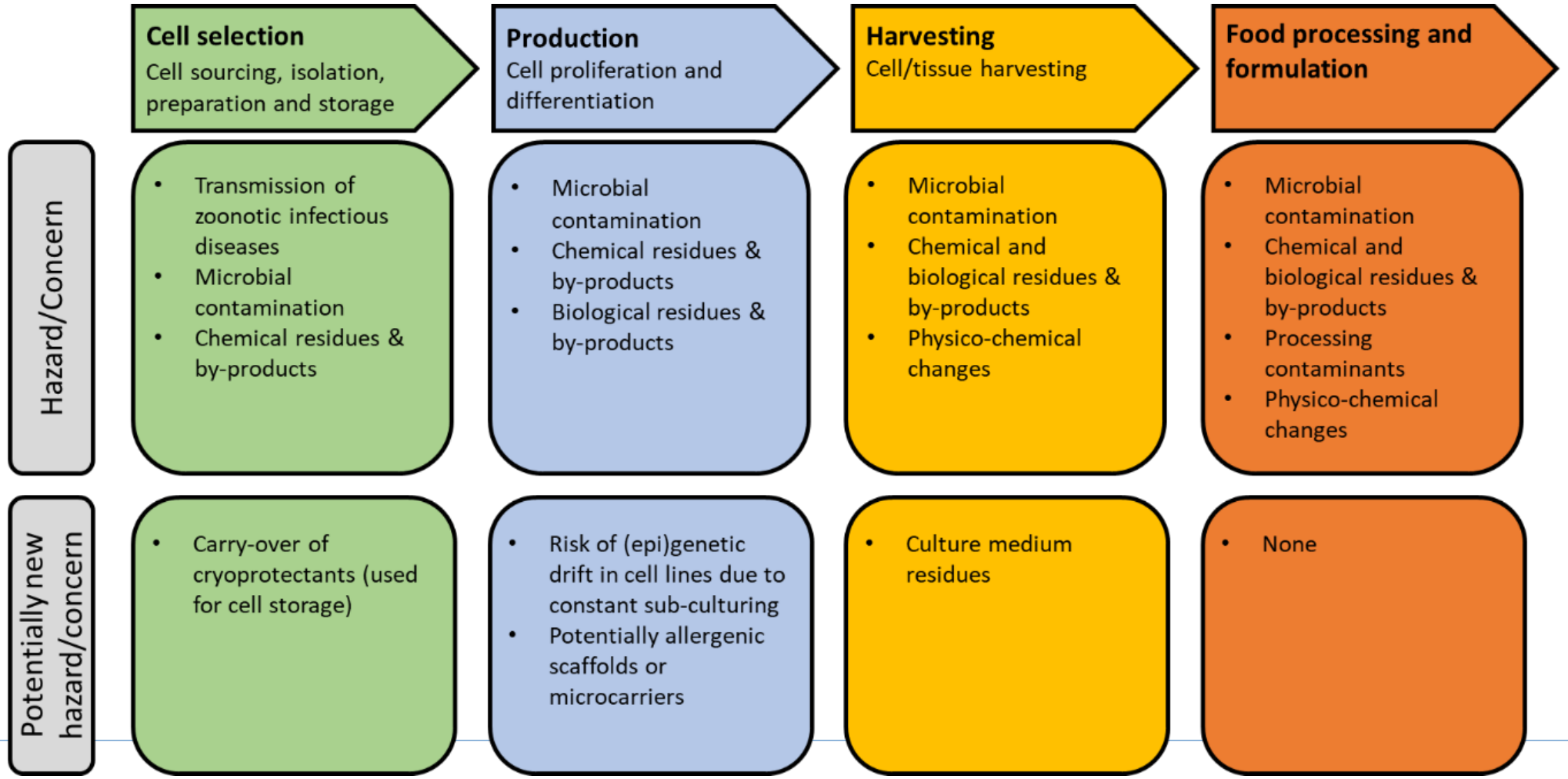
Hazards are not **Risks**

Comprehensive hazard identification is the first step of food safety risk assessment process:

1. **Hazard identification**
2. Hazard characterization
3. Exposure assessment
4. Risk characterization

Extensive list of more than 40 potential hazards have been identified in 4 different production steps

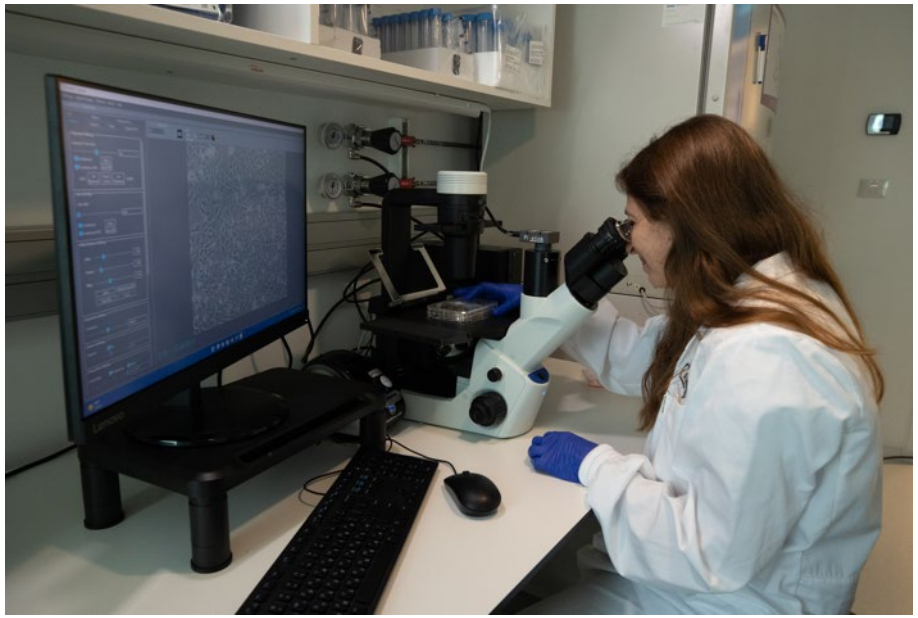
Hazard identification based on 4 production phases



Results of hazard identification (I)

Many hazards are already well-known and they exist in the conventionally produced food. For example, microbiological contamination can occurs at any stages of any food production processes, including the one of cell-based food

Most cases of microbial contamination during the cell growth and production stages inhibit cell growth. If the cells have grown and reached product expectations for harvest, then such contamination would not occur during the production process but could occur post-harvest, as is the case with many other food products.



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Results of hazard identification (II)

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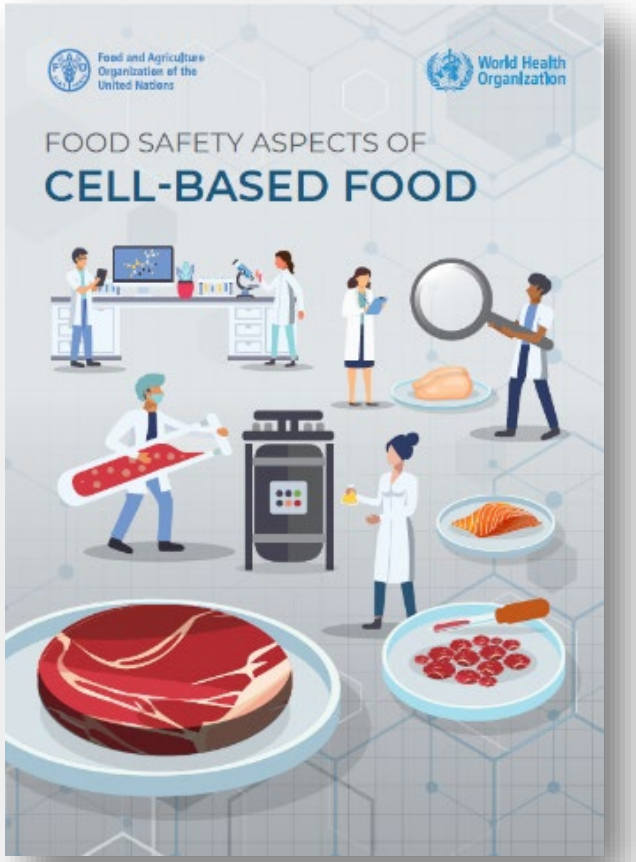
- Various existing control measures and good manufacturing and hygiene practices, and Hazard Identification and Critical Control Points (HACCP), are applicable to ensure food safety for cell-based food.
- Food safety plans would also need to focus on the materials, inputs, ingredients, and equipment that can be specific to cell food production, referring to the use of new substance applications to nourish the cells; and the possibility of allergic reactions to them.
- While such inputs and materials can be new, existing preventative measures and safety assurance tools are applicable to control such hazards

Effective communication and transparency are essential

While specialist clearly differentiate the concept of “hazard” and “risk,” the importance of this distinction is not always commonly understood and appreciated by the media or consumers

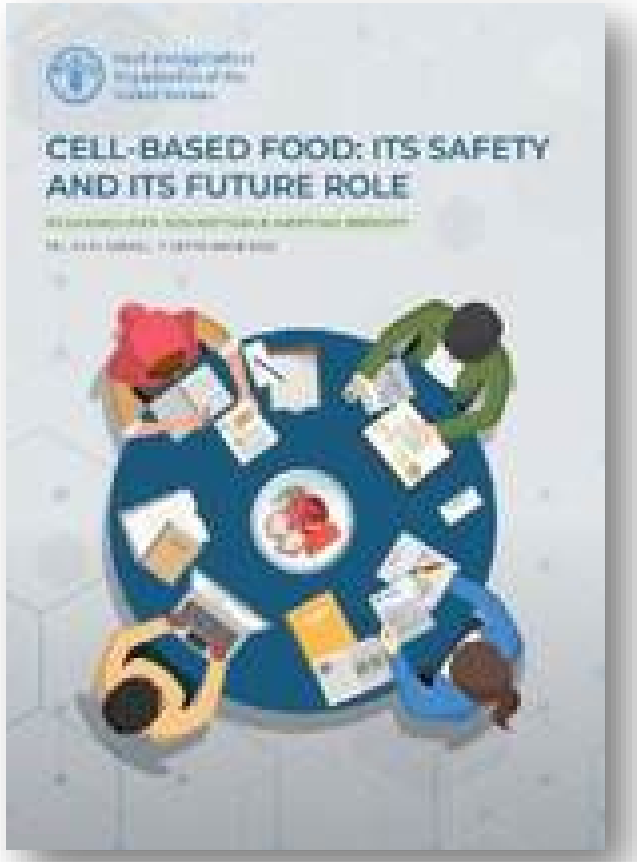
Therefore, the list of hazards identified by the Technical Panel could be all perceived as risks, rather than controllable hazards with variance in probability and degree of threat.

Food safety is not something to be taken for granted. Any foods can be unsafe to begin with. We (people) make food safe.



FAO/WHO milestone publication

Factsheet



Stakeholder meeting report

Food and Agriculture Organization of the United Nations

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Thank you