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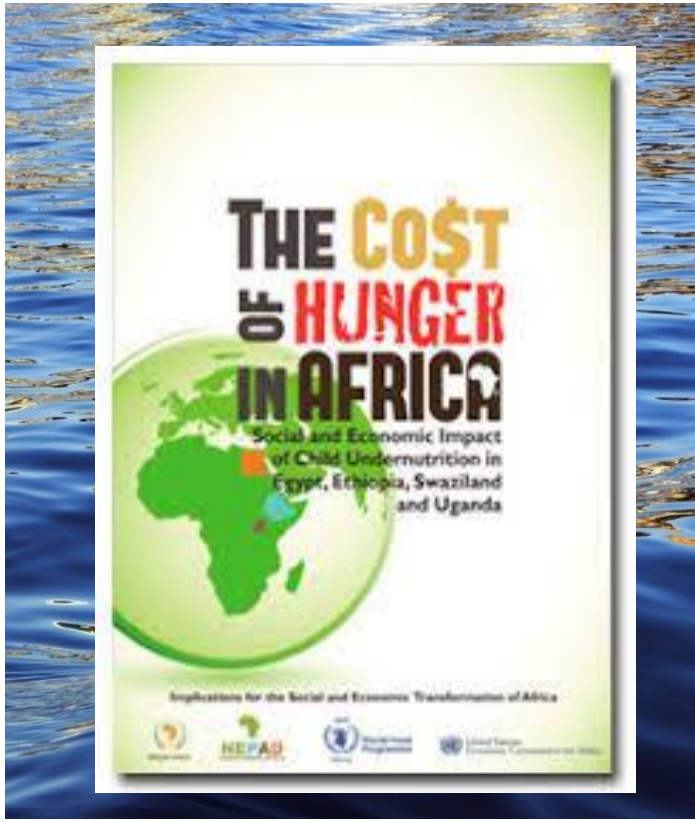
SAEOPA

Southern African Essential Oil Producers' Association

THE FUTURE OF ESSENTIAL OILS AND SEED OIL INDUSTRY IN CELLULAR AGRICULTURE



Thierry Régnier, Belinda Meiring

What We Are Going To Talk About

- The New Sustainability
- Cellular Agriculture
- Role of Essential oils and Vegetable Oils
- The Future

DIFFERENCES BETWEEN

VEGETABLE OIL

- *Almost odorless*
- *It is extracted from oleaginous fruits*
- *Edible and/or cosmetic uses*

Examples:

- *From seeds in general: sunflower, olive, sesame, almond, rosehip,...*

ESSENTIAL OIL

- *Strong odor*
- *Extracted from plants with many aromas*
- *Only cosmetic or therapeutic use*

Examples:

- *Essential oil of rosemary, lavender, sage, ginger, tea tree,...*

Botanical-online.com

The New Food Entrepreneur Driven by:

Social conscience

Health & wellness

Enhanced nutrition

Life hacking

Mass market orientation

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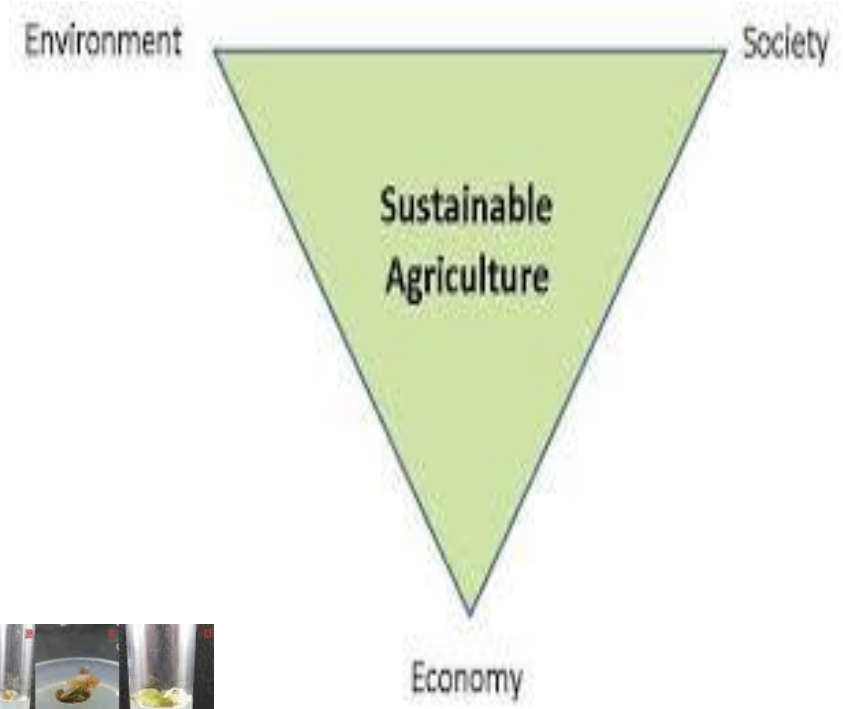
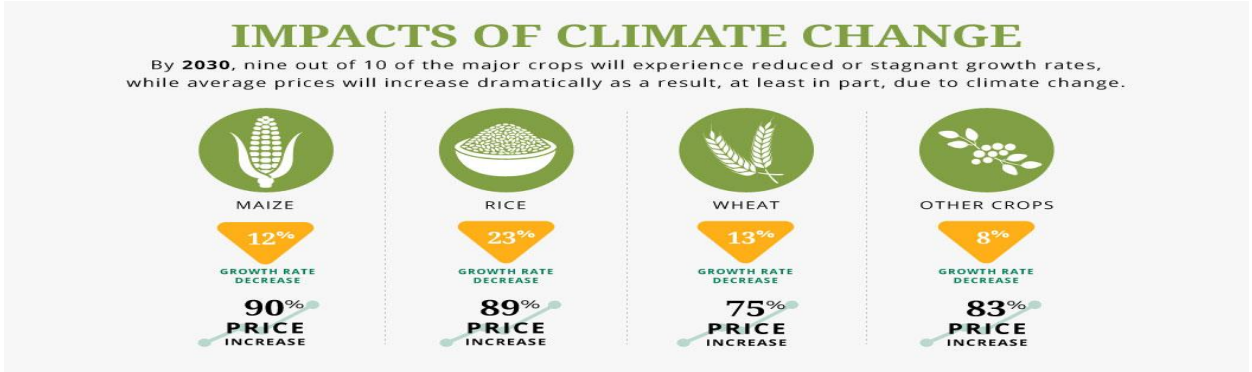
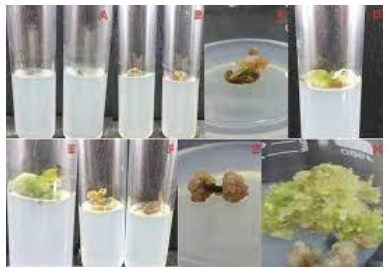
SO ARE THE ESSENTIAL OIL AND SEED OIL ENTREPRENEURS

The New Sustainability

Strategic sourcing







In vitro callus induction

Cellular Agriculture –
The Factory Farm of the Future

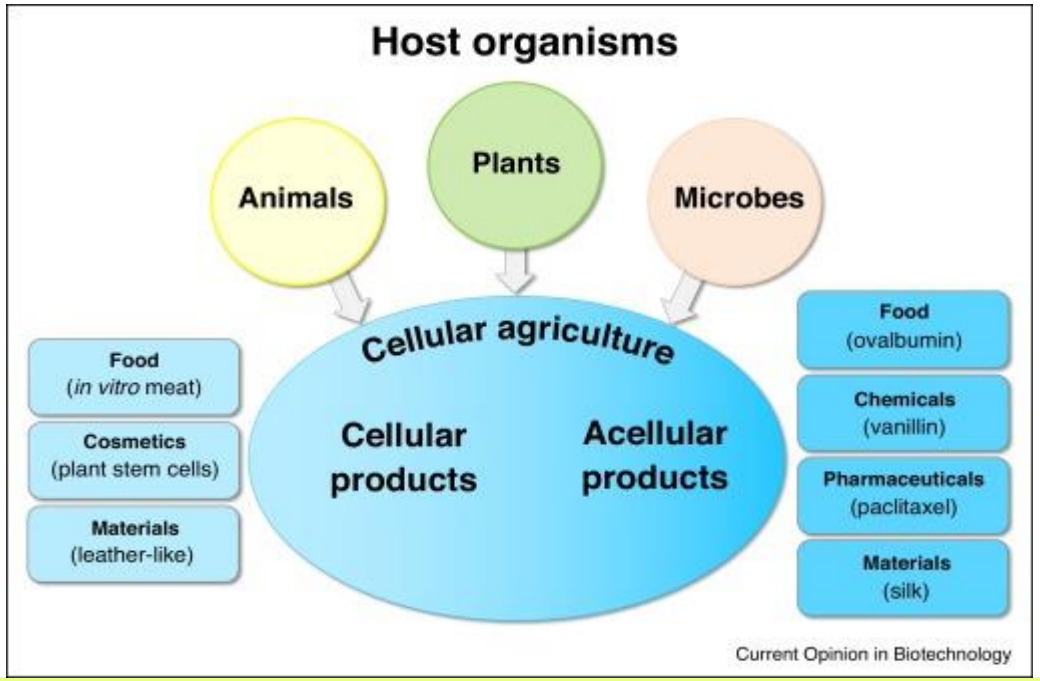
"The new Cellular Agriculture industry will grow not in our countryside, but in our cities where the infrastructure and manpower required to develop such facilities may already exist"

Cellular Agriculture

https://new-harvest.org/what-is-cellular-agriculture/

Global food security requires food to be available, consumed, and stable for all individuals. These requirements may be promoted by cellular agriculture with appropriate consideration during the setting up of the field.

This is the production of animal products in cell cultures or " Animal based products made without animals"



Cellular Agriculture Challenges:

1. Developing a legal framework
2. Ability to produce on a large scale
3. Project funding
4. Consumer trust and taste acceptability
5. Media exposure

Cellular Agriculture benefits:

1. Reducing Environmental Impact
2. Public Health Impact
3. Animals Welfare
4. Feed the planet
5. Transparency
6. Customize attributes

https://medium.com/geekculture/5-reasons-why-we-need-lab-grown-meat-3cd43e3052cc

FOOD PRODUCTS

Cultured meat in Africa???

From springbok to beef and chicken – how meat made in a petri dish is coming to South Africa

- **Mogale Meat Company and the Mzansi Meat Co. are two South African companies that want to make meat in a laboratory, without harming animals.**
- **They call it cultivated meat and in theory, it tastes the same as real meat, but instead of farming cows out on a field, they take cell proteins and grow them in bioreactors.**
- **They want to counter the rising cost of meat and its impact on the environment.**
- **Africa alone is expected to add 1.3 billion people by 2050. That's a lot of mouths to feed.**
- **Here's how two South African companies hope to help feed them.**

https://www.businessinsider.co.za/how-cultivated-meat-made-in-a-south-african-lab-could-end-up-on-your-plate-mogale-meat-company-and-mzansi-meat-co-2021-9

PROUDLY manufactured in South AFRICA!

MEAT OUR FUTURE

MOGALE MEAT CO EST 2020

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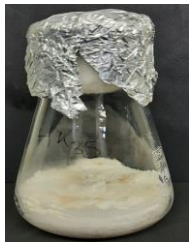
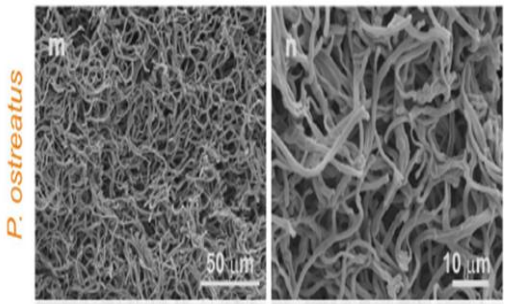
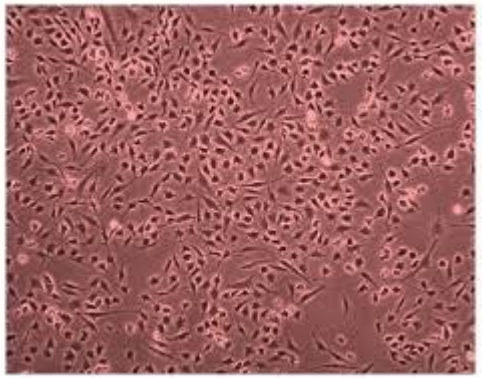
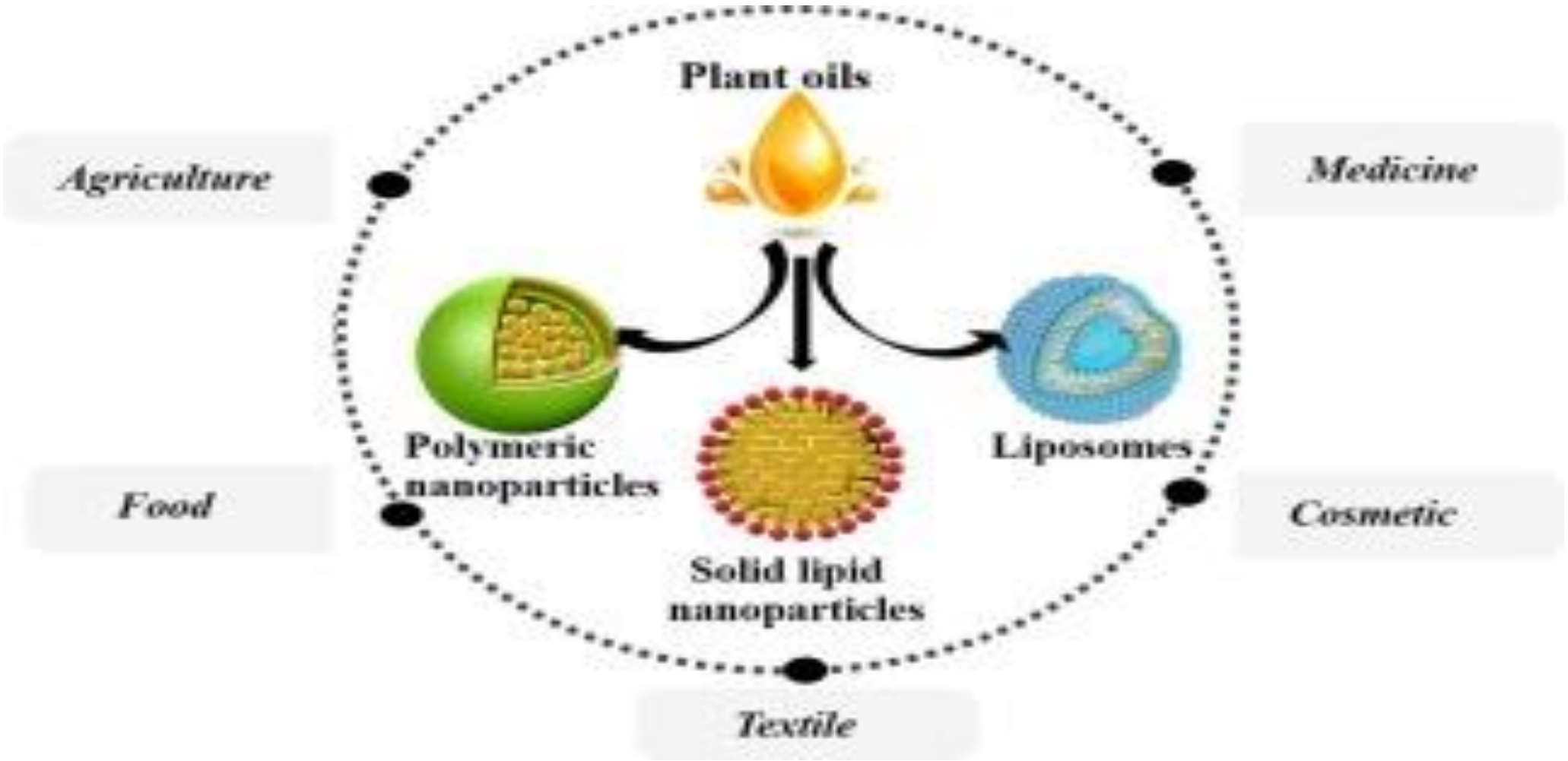
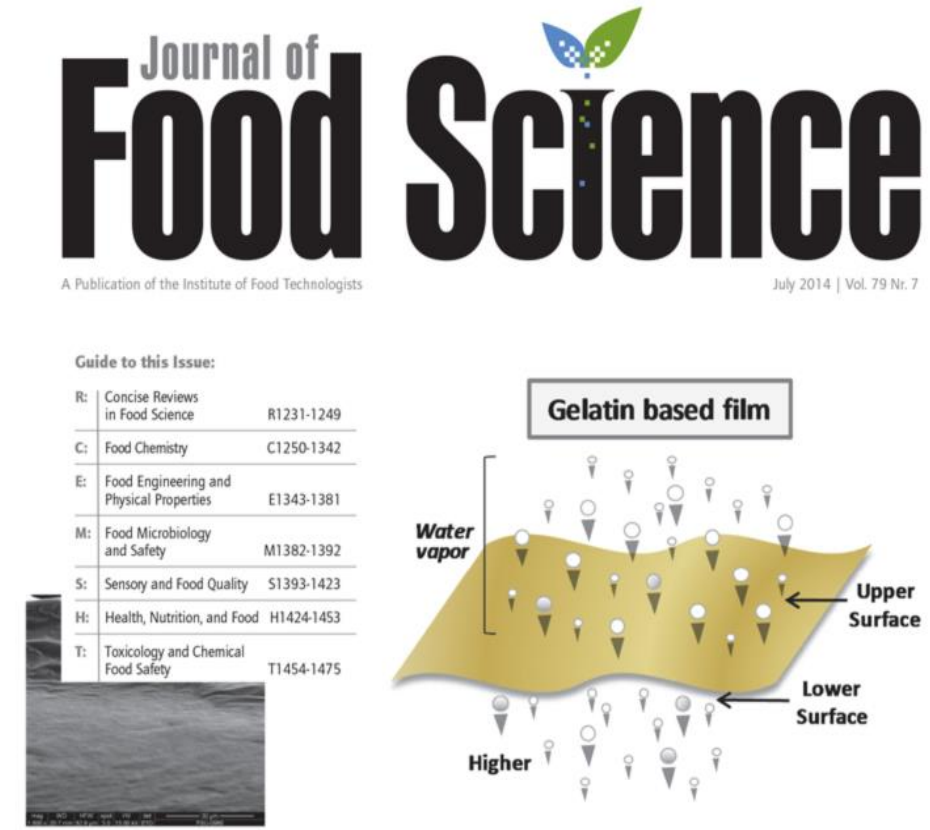


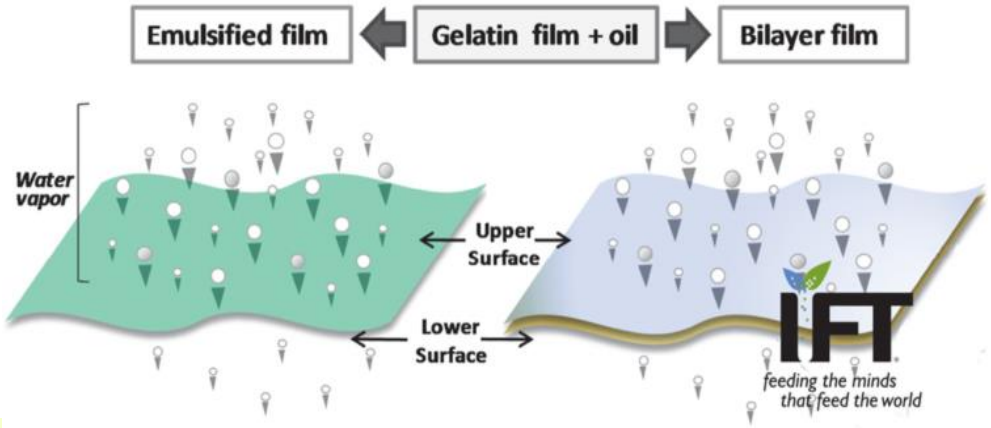




Role of Essential oils and Vegetable Oils







Role of Essential oils and Vegetable Oils

Vegetable/essential oils are known to have countless benefits.

Health benefits

Primarily it is the major source of energy and a carrier of essential nutrients which are vital for growth and metabolism, protecting brain cells, reducing the risk of heart diseases, etc.

Taste

Most vegetable oils help to make the food delicious and nutritive too because of their unique fatty acid profile which enhances the flavour.

Shelf-life

Many essential oils (garlic, rosemary…) have antimicrobial and antioxidant properties that control the growth of bacteria in food. They act as natural preservatives.

APPLICATION OF ESSENTIAL OILS IN FOOD INDUSTRY

Saeed et al. 2022. Journal of Essential Oil Research. doi:10.1080/10412905.2022.2029776

Jugreed et al. 2020. Trends in Food Sciences & Technology. https://doi.org/10.1016/j.tifs.2020.04.025

The European Commission and the United States have registered essential oil bioactive components as a commercial flavoring agent.

There are a few exceptions like estragole, which are in the EAFUS list but prohibited on the EU list due to their genotoxic and carcinogenic nature.

The oils can be used in Cereal-based products, fruits and vegetables juices, during postharvest (coating), dairy products, sea foods and meat and meat products. BUT also in biodegradable packaging…

While using essential oil in edible commodities as a preservative, its strong organoleptic characteristics should be considered first .

Due to their diverse bioactive profiles, essential oils have strong antimicrobial and antioxidant properties, making them as an ideal replacement of synthetic food additives in commercial food products.

In current scenario, packaged food consumerism posed real scourge of food-borne illnesses due to synthetic additives used to maintain organoleptic and microbiological food quality.

Utilizing preservative properties of essential oils is considered as a natural solution to these problems.

Essential oils not only enhance the product shelf life but also act as natural flavoring agent. Essential oil alone and in combination are also incorporated in food packaging material in order to control food-spoiling agents.

APPLICATION OF OILS IN CELLULAR FOOD PRODUCTS

Oils and fats play a foundational role in driving great sensory experiences in meat alternatives. They **enhance taste, texture, appearance, aroma, and cooking**.

Taste is greatly influenced by oils. The choice of oil or fat determines an application's melt profile and flavor delivery, including upfront flavors and lingering, savory aftertaste. Liquid oils, including canola and sunflower oils, deliver more flavors upfront at the initial bite.

Texture: A key texture feature in alternative meats is juiciness, which is greatly affected by oil. Liquid oils, for instance, like soybean, canola, and sunflower, work very well for creating juicier and more tender textures. This is especially the case in hot dog, meatball, and nugget applications.

Appearance: The fat is intermingled and dispersed throughout the lean component of the product. In patty and sausage applications this yields a delicious visual and more authentic look.

Aroma: Oils and fats affect aroma development in alternative meats during cooking. Exposure to heat oxidizes fatty acids, which produces volatile compounds with characteristic aromas. They amplify the dispersion of aroma compounds from spices, herbs, and other flavorings while cooking. Oils and fats play a key role in cooking effects, such as spattering, that help to construct a meat-like experience in the kitchen and on the plate.

APPLICATION OF OILS IN CELLULAR FOOD PRODUCTS

In 2013, the first cultured meat prototype in the shape of a hamburger was presented in the media. The hamburger was based on 10,000 strips containing myotubes engineered in a hydrogel. However, the engineered muscle-like tissues also required the addition of colorants (beetroot juice), flavors (saffron and caramel), and texturizers (bread crumbs and a binder) to make the patty similar in appearance to a hamburger.

Although coconut oil has a similar nutritional profile to other cooking oils, the main difference lies in the specific types of fats it contains. The majority — 83 percent — of the fat in coconut oil is saturated fat, the kind typically found in animal products like meat and dairy.

Essential oils have shown remarkable antimicrobial potency against spoilage and pathogenic microorganisms in meat and meat products.
EOs from **oregano, rosemary, thyme, clove, balm, ginger, basilica, coriander, marjoram, and basil** have shown a greater potential to be used as an antimicrobial agent. In addition, scented molecules have been used as food additives and in meat packaging.

The Future

According to the Organization for Economic Co-operation and Development - Food and Agriculture Organization (OECD-FAO) Agriculture outlook 2020-2029, the growth in global meat consumption is projected to increase by 12% between 2020 to 2029.

Moreover, according to The World Counts report, global meat consumption is expected to reach between 460 and 570 million tons by 2050. Thus, increasing consumption of meat and meat products drives the market for cultured meat.

At least 60 companies worldwide now make up the emerging cell-grown meat industry, and with nearly a billion dollars invested in 2021 alone, their products are eagerly anticipated.

Vegetable/seed oils and essential oils will be playing an important role in the cell-grown fish and meat / plant-based meat industry due to their properties as antimicrobial agents.

However, the future of these oils will be in their application in the product itself in order to provide the consumers with an identical texture, aroma and appearance to the conventional food products.

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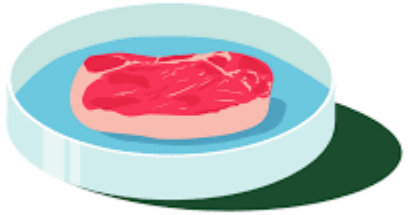
Thank you



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