MICROBIAL MEAT ANALOGUE

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Date Time : 18 June 2024 at 12 : 00

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INTRODUCTION

- Produced by advanced biological processes
- Plant based or microbial
- Has similar appearance to the original meats but there are differences in the ingredients
- It is also called artificial meat or imitation meat

SCRUTINY OF MEAT ANALOGUE

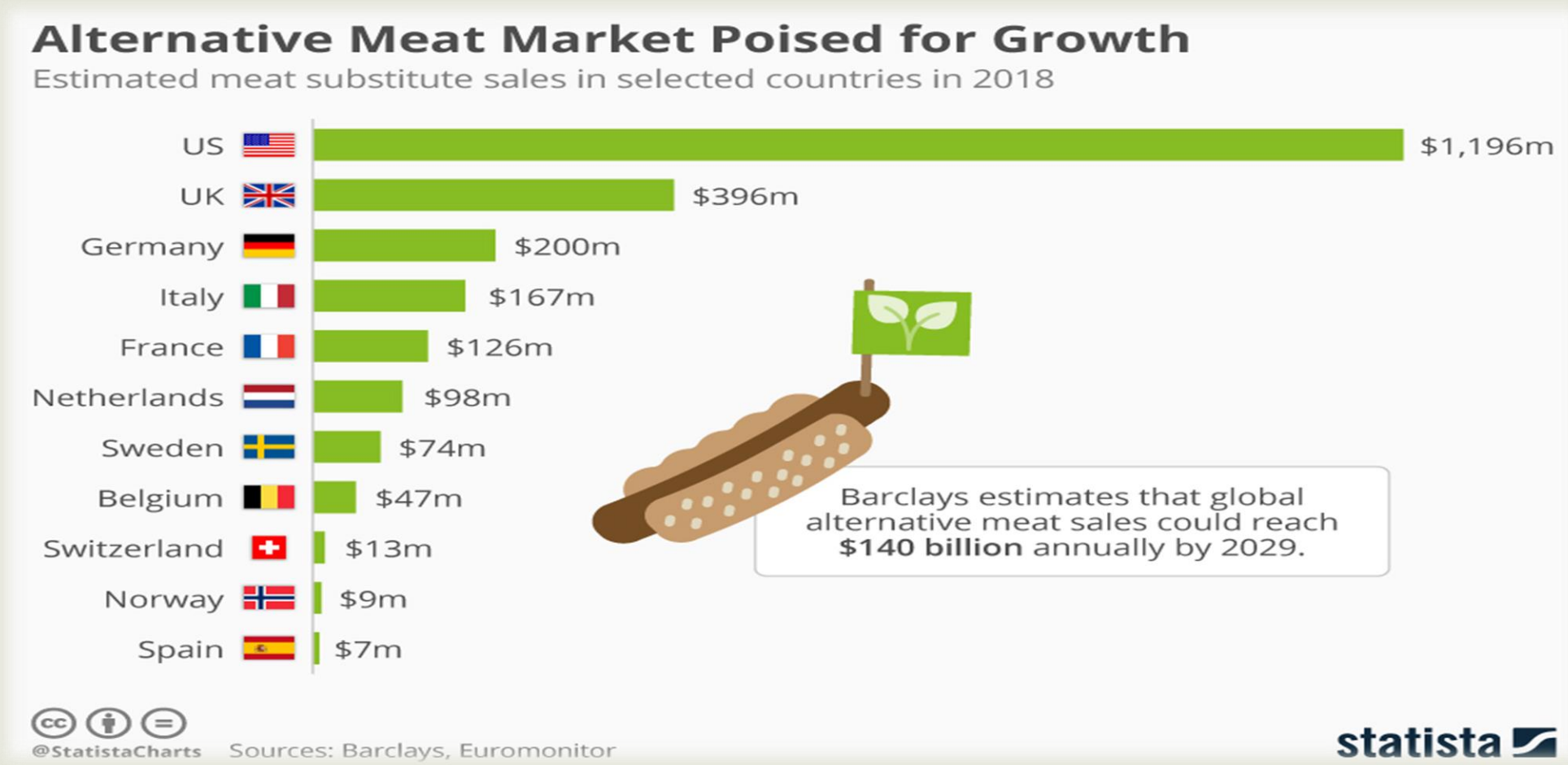
Advantages

- Easy maintenance
- Suitable for vegan
- Low cost
- Maintaining animal welfare
- Ecologically beneficial

Disadvantages

- Low nutritional value
- Trans fat
- Harmful additives (nitrate, nitrite and sulfur dioxide)
- Phosphates added for thickening

MARKETING


Alternative Meat Market Poised for Growth
Estimated meat substitute sales in selected countries in 2018
US $1,196m
UK $396m
Germany $200m
Italy $167m
France $126m
Netherlands $98m
Sweden $74m
Belgium $47m
Switzerland $13m
Norway $9m
Spain $7m
Barclays estimates that global alternative meat sales could reach $140 billion annually by 2029.
@StatistaCharts
Sources: Barclays, Euromonitor
statista

SOY

- Contains 8 essential amino acids (leucine, isoleucine, valine, phenylalanine, threonine, methionine, tryptophan and lysine)
- Good source of fiber, iron, calcium, zinc and B complex
- High protein (36gr protein in 100gr)
- Without cholesterol
- Low saturated fatty acid
- Low cost

SOY MILK

- Soaking dry soybean and grinding them
- Contains 5.3% protein like cow's milk
- Suitable for people with lactose intolerance
- Fortified with calcium carbonate to make it digestible for humans (because it have insoluble calcium)

TOFU

- Made from condensed soy milk
- Plant based
- Contains large amounts of micronutrients
- Contains calcium, phosphorus and isoflavone
- High protein (17gr protein in 100gr)
- Made into compact cubic blocks

SEITAN

- Plant based
- Produced by gluten
- Low carbohydrate
- High protein(25gr protein in 100gr)
- Contains iron, calcium and phosphorus

CULTURED MEAT

Selection of starter cell

Place in culture medium

Transfer to the bioreactor

forming

SINGLE CELL PROTEIN (SCP)

- Called microbial protein (raw or edible protein)
- Provided by mold, yeast, bacteria or algae
- Used as a protein supplement

SINGLE CELL PROTEIN (SCP)

Advantages

- Cheapness of raw materials for production
- Rich in protein content (2.3gr in 1cup)
- Production of various amino acid compounds
- More digestible than vegetable protein

Disadvantages

- Possibility of secondary metabolite production (Toxin)
- Cause digestive reactions in some people
- Cause gout and kidney stones due to high consumption
- Cause allergic effects in some people

ATTRIBUTES OF SELECTED MICROORGANISM

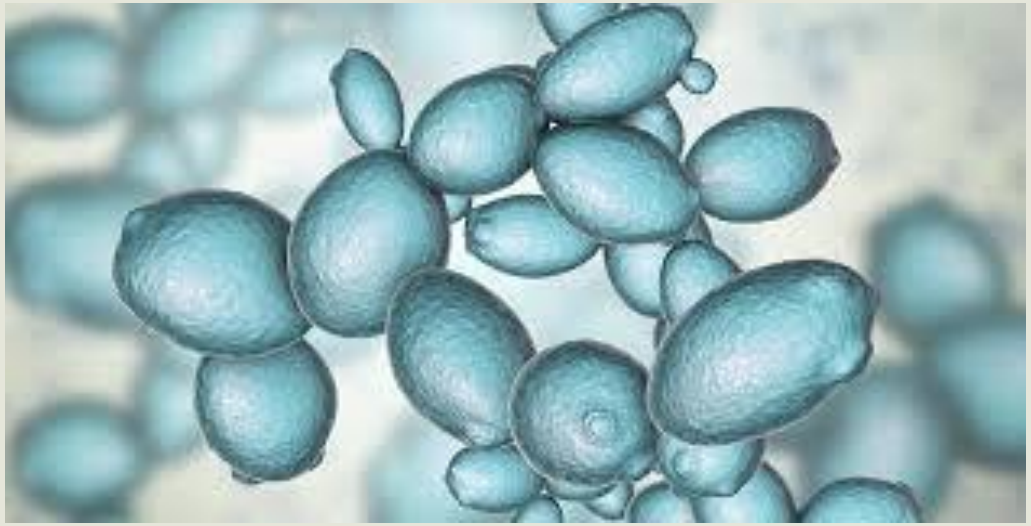
- Fast growth rate
- Genetic manipulation
- Compatibility with a wide range of substrate
- Ability to cultivate in large scale
- No toxin
- The ability to collect a large amount of protein

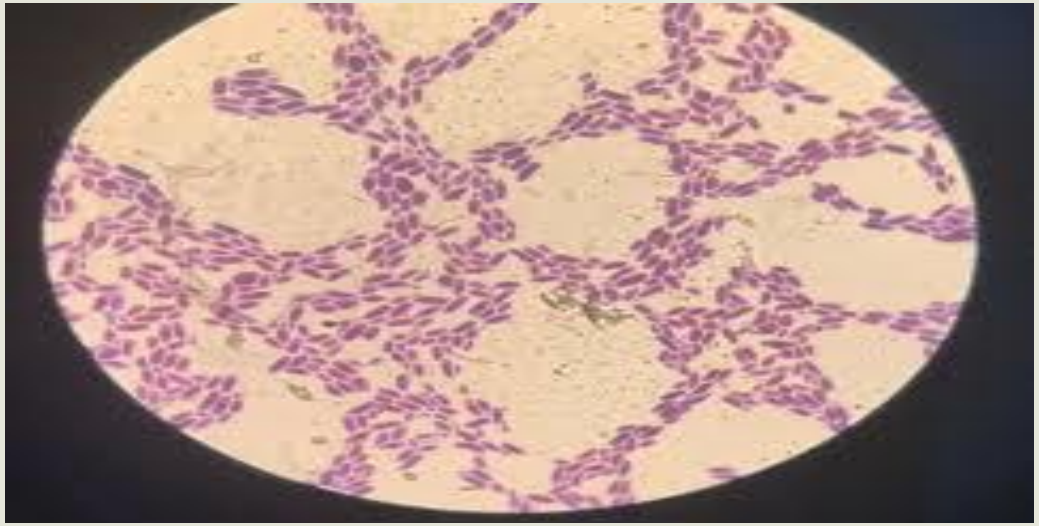
MICROORGANISM USED IN SCP PRODUCTION

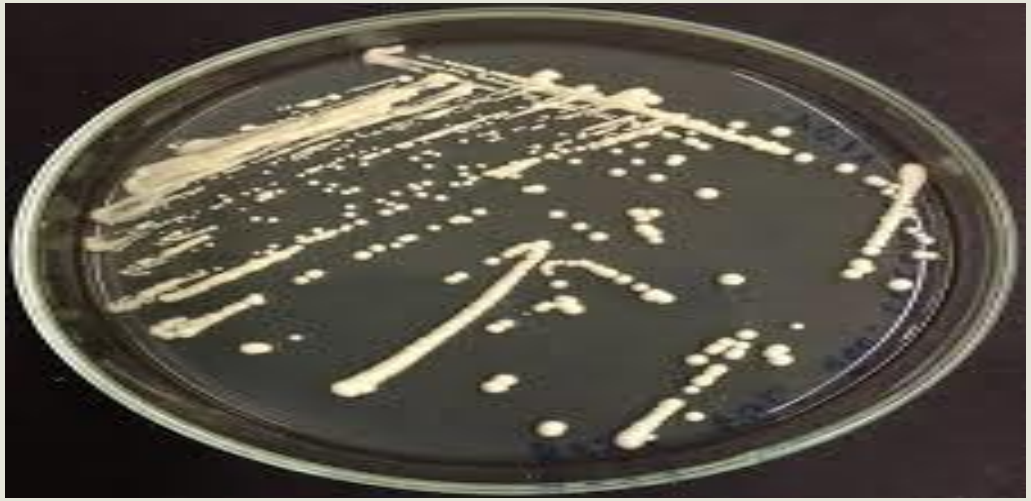
- Algae : Spirulina maxima, Chlorella pyrenoidosa
- Bacteria : Methylmonase clara, Achromobacter delvacvate, Bacillus megatrium
- Mold : Aspergillus niger, Trichoderma viride, Paecilomyces variot
- Yeast : Candidia lipolitica, Saccharomyces cerevisiae

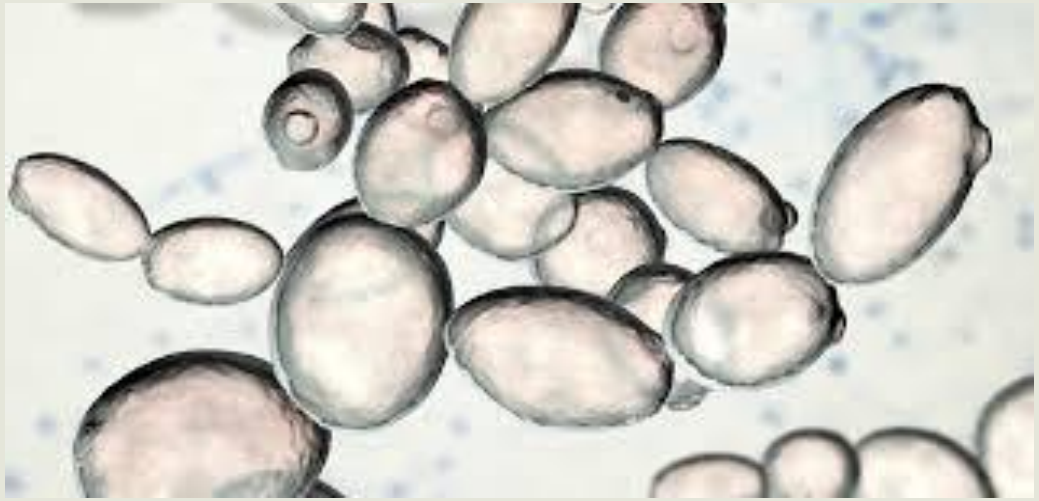
SACCHAROMYCES CEREVISIAE

- Isolated from grape skin
- Being used in the production of bread, cake and bear
- Being used in the production of SCP and newly synthesized protein
- Optimum temperature = 25-30
- Optimum pH = 4.5-5.5
- Diameter = 5-10 micrometer
- Use due to the high production rate of SCP (32-38gr per liter)









UP STREAM

- Saccharomyces cerevisiae (microorganism)
- Pineapple waste (substrate)
- Dextrose peptone culture medium (pH=6, T=4, 10gr yeast extract, 20gr dextrose, 20gr peptone, 20gr agar, 1000ml water) (substrate)
- sterilization in T=121 till 15min

MAIN STREAM

- Continuous fermentation
- 5 culture medium (10gr D-glucose, 1gr nacl, 1gr cacl2, 0.5gr mgso4, 1000ml water, pH=5.5)
- Putting in incubator in T=28 till 7 day
- With aeration

DOWN STREAM

- 1) Ultra filtration : in order to concentrate protein
- 2) Centrifuge : in order to separate the protein content (t=10 till 30 min, v=1000 till 2000 rpm)
- 3) Settle down : in order to deposit
- 4) Screening : in order to protein separation by semipermeable membrane

- Hint : we use ammonium sulfate in settle down because for low cost, produce high amounts of protein and differentiate protein from by product

REFERENCE

- Perplexity AI
- Gpt4 AI
- Replica AI
- Production of SCP from pineapple waste
- Meat analogues : types, methods of productions
- Google scholar
- Pubmed

THANKS FOR YOUR CONSTANT REMARK