

# Protein production possibilities

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SUSANNA MORLEY

GROW CONSULTANCY WA

# Why traditional protein production models have to change

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- Environmental damage
- Economic efficiency
- Sustainability
- Cost to health
- Increasing and ageing global population

# Drivers of change

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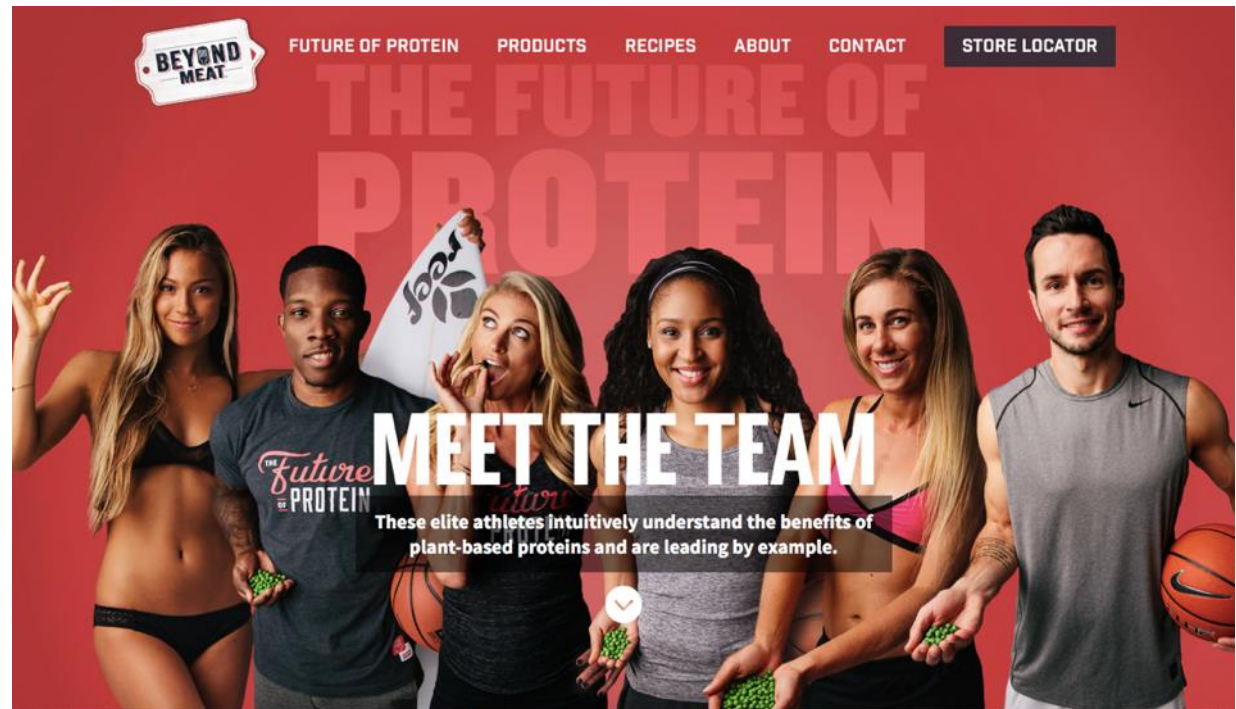
- Consumer demands
- Consumer identity

Sustainability✓

Acceptability✓

Healthy✓

Safe✓



# Drivers of change

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- High yield
- Robust commodity
- Accessible extraction and processing
- Technology must improve quality, taste, functionality



# Three forms

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**Plant**

**Aquatic biomass**

**Insect**

**Game**

What the consumers think

Science and technology applications

How might it work in the SW?

# 1. Plant protein - GRAINS

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## Consumer perception

Sustainability✓

Acceptability✓

Healthy✓

Clean label ✓

## Suitability for South West?



## 2. Plant protein - LEGUMES

## consumer perception

## Sustainability✓

## Acceptability✓

Healthy✓

## Suitability for the South West?

high value add required





### 3. Plant protein

Consumer perception

Sustainability✓

Acceptability✓

Healthy✓

Clean label ✓

Suitability for South West





# 1. Plant protein – RuBisCo, high value functional protein

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**Enzyme ribulose-1,5-bisphosphate carboxylase/oxygenase.**

Consumer perception ✓

Suitability for Southwest

Scalable ✓

Sustainable ✓

High Yield ✓

High Value / multi Functional: balanced amino acid profile, good digestibility, foaming, gelling and emulsifying properties e.g. mayonnaise, meat analogues, 3D printed protein

# 1. Plant protein – RuBisCo, high value functional protein

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**Shredding**



**Pressing**



**Decantation**



**Centrifugation**



**Membrane  
filtration**



**Adsorption**



**Spray drying**



**The Protein powder**

## 2. Aquatic Biomass

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**New Wave Foods** – marine conservation and materials scientists Dominique Barnes and Michelle Wolf in a Biotech accelerator. Using plant proteins and algae in shrimp diet to deliver a substitute with the same nutritional profile

consumer perception

Sustainability✓

Acceptability ?✓

Healthy✓

Suitability for the South West?



## 2. Aquatic Biomass

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**Animal feed functional application – Dr. Andrew Kinley, CSIRO**

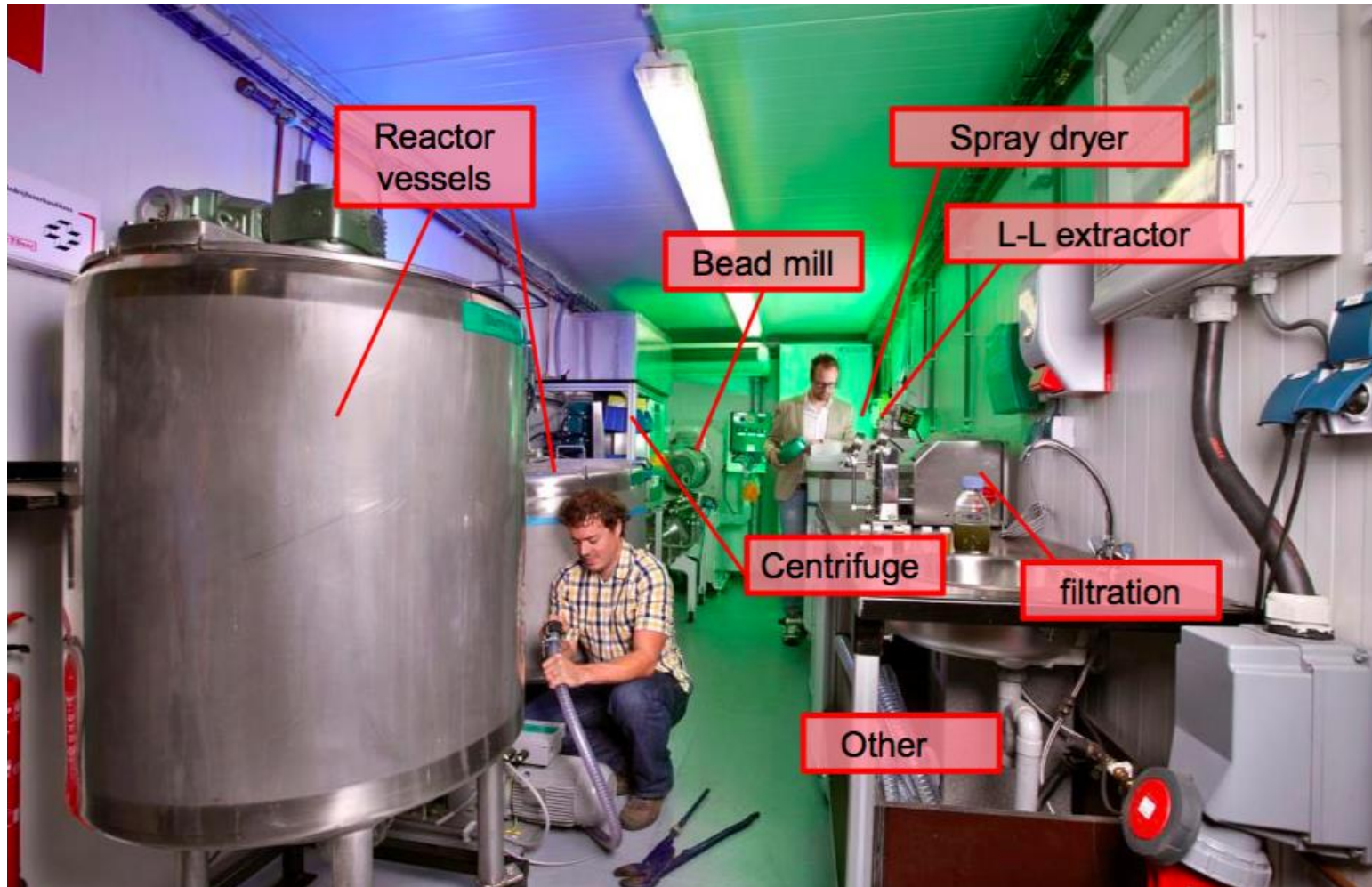


<https://theconversation.com/seaweed-could-hold-the-key-to-cutting-methane-emissions-from-cow-burps-66498>



## 2. Aquatic Biomass

### The RuBiSco principal – Mobile Algal Cell Disruption Technologies



### 3. Insects

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#### consumer perception

Sustainability - high protein conversion ration✓

Healthy - 2 x protein of beef

all 9 essential amino acids, fat, fibre and minerals

Acceptability - niche Western / global South✓

value of this market is up to 1.5 billion USD in the next 5 years.











### 3. Insects

#### Buffalo worms



<b>ENTOPURE®</b> Whole Dried Larvae	<b>ENTOPURE®</b> Protein Powder	<b>ENTOPURE®</b> Protein Isolate	<b>ENTOPURE®</b> Purified Oil	<b>ENTOPURE®</b> Chitin Powder	<b>ENTOPURE®</b> Proti-Fertilizer
					
Dried larvae from the buffalo	Dried and grinded powder from the buffalo	Pure, defatted protein powder from the buffalo	Purified oil from the buffalo	Purified chitin powder from the buffalo	Dried rest-streams from the buffalo

### 3. Insects

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Relatively simple farming methods, low foot prints, HACCP certification 2014

Uptake for SW – regulatory and bio security issues

Human consumer acceptability

Peel - Aqua culture feed a possibility.

# Take away message

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Take time to watch what the market leaders are doing with the expensive technology and which way consumer culture and acceptance will lead.

And consider whether the real profitability will be in providing premium, quality, competitive second and third generation protein commodities for export on the kind of barley for malting or wheat flour for udon scale. Is that where you should be heading?