

Collaborative R&D and commercialisation of OAL Steam Infusion (advanced heating and mixing) for the provision of healthier food products (soups, sauces, ready meals, drinks)

Jake Norman - OAL Group, UK



Let's talk change



Food manufacturing today

Traditional soup / sauce production

- OAL supply processing systems from ingredient feeds to filling.
- Chilled, frozen ambient food manufacturing.
- UK chilled food at c£10Bn, most developed in the world.



Steam Infusion Technology

The Vaction™ unit

Uses steam as the motive force:

Very efficient heating.

Mixing and entrainment.

Functions as a pump.

Simultaneously!

Offers opportunity to reduce processing stages.

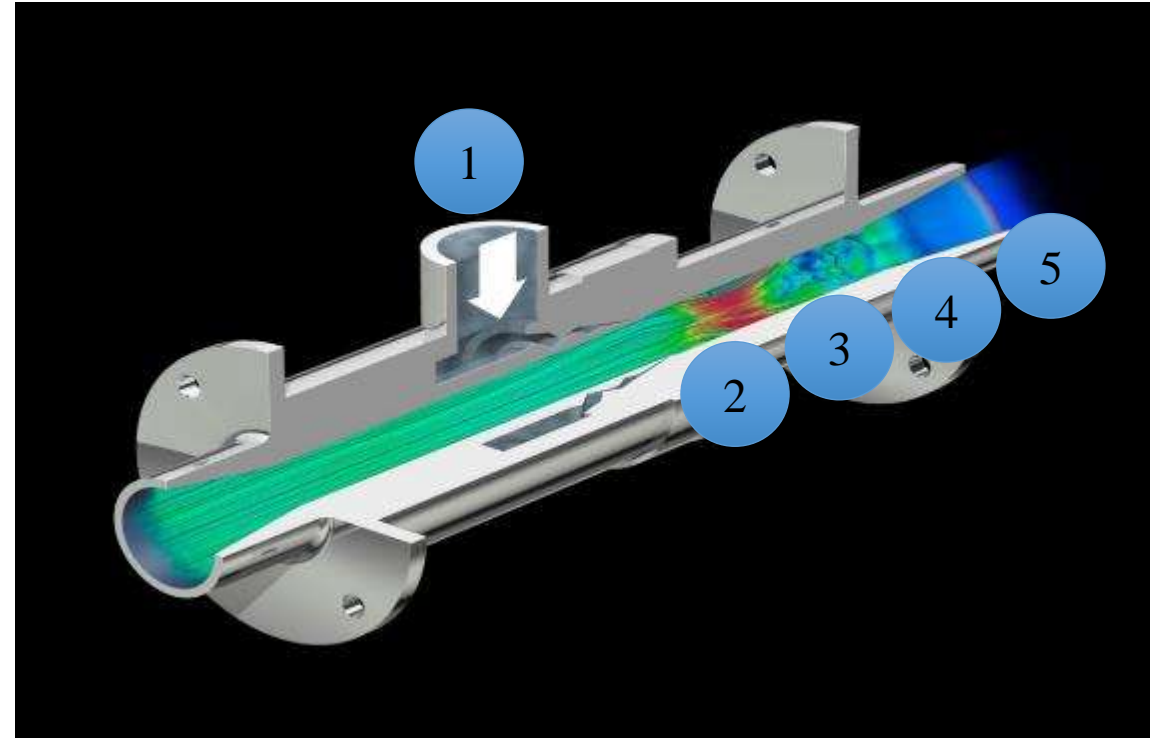
Leverages opportunities in starch hydration and flavour transfer.



Steam Infusion Technology

Vaction™ unit operation

1. Steam is introduced into the annular conditioning chamber.
2. Steam is then injected into the process flow, creating momentum transfer.
3. Vaction™ unit geometry forces the steam to become supersonic, forming a controllable shockwave.
4. Mixing and heat transfer takes place in the controllable low pressure supersonic region.
5. The Vaction™ unit allows control of the supersonic zone and control of the unit capabilities.



P1: Nutrition for Life Heating & Mixing

Advanced Heating, Mixing and Cooking

Aim: Improve the nutritional benefit of food products whilst minimising production costs.

- Understand operating envelope.
- Rank and improve existing products.
- Develop new products that do not currently exist.

OAL

UNIVERSITY OF
LINCOLN

BAKKAVÖR



In action: Maize hydration for maheu

Dairy Gold Ltd. - Zambia

- 15,000 litres per hour system.
- Vary product characteristics.
- Highly energy efficient.
- Less labour intensive than traditional technologies.



P2: Improving Supply Chain Efficiency

Advanced Cooking & Rapid Cooling

Aim: Resolve major issues effecting food quality, nutritional values, productivity and waste.

- Rapid cooking + rapid nitrogen cooling.
- Step change in supply chain efficiency for ready meals, soups and other sauce based food products.

OAL

 UNIVERSITY OF
LINCOLN

Iceland
MANUFACTURING LTD

 **BOC**
A Member of The Linde Group



In action: Syn Free Frozen Ready Meals



Exclusive to Iceland

Slimming
WORLD

touching hearts, changing lives

Slimming World Meals Exclusively at Iceland

i Due to incredible popularity, we're running low ... We're working as hard as we can to make some more and will be back online soon.

You can still get a good selection in your **local store**.

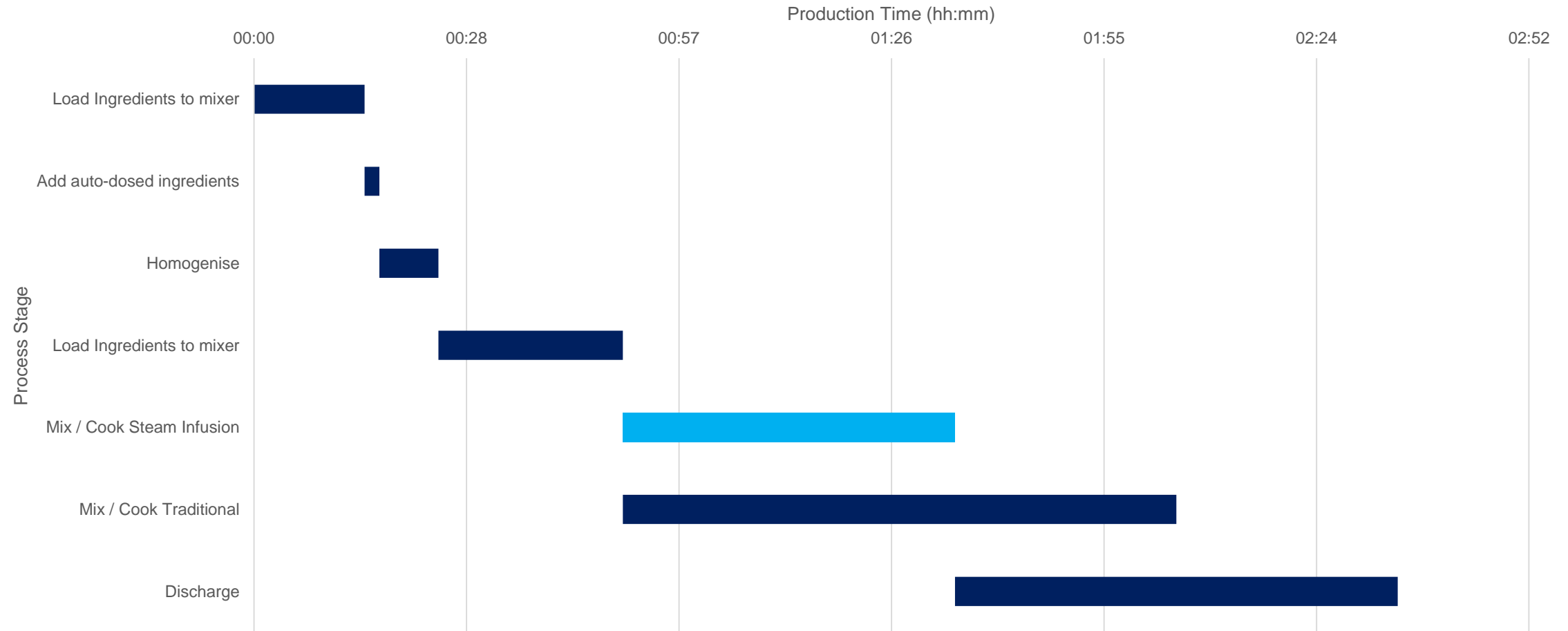
love food
love Slimming World

chicken tikka masala

FREE FOOD
Lita Low

Exclusive to Iceland

Targeting the bottlenecks



Inherent challenges

Incremental has limitations.

- Utilisation - homogeniser c3%.
- Pipework and valve matrices.
- Labour intensive.
- Poor yields – losses c5% to 10%.
- Quality challenges.
- Effluent waste.

What if?

Flexible manufacturing.

Emulating how a chef cooks on an industrial scale.

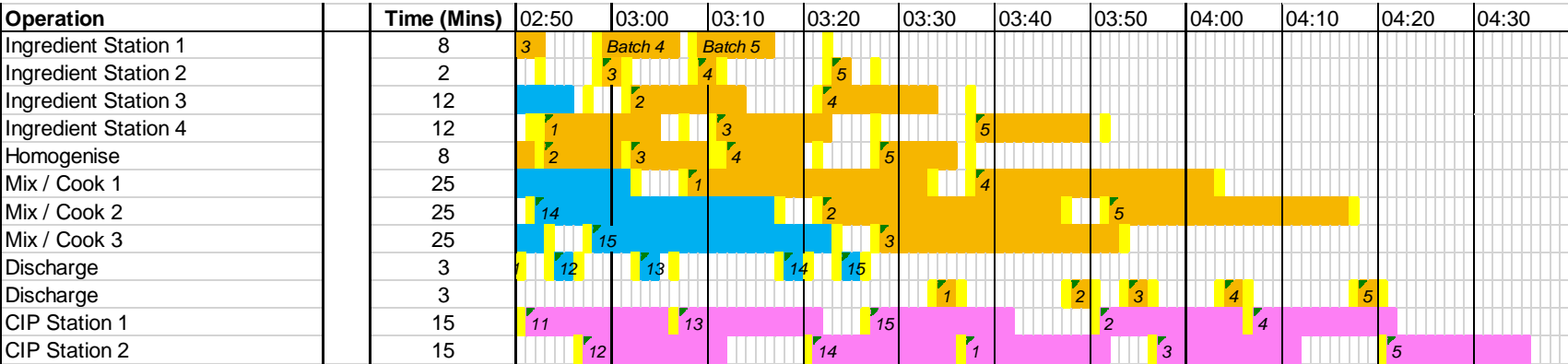
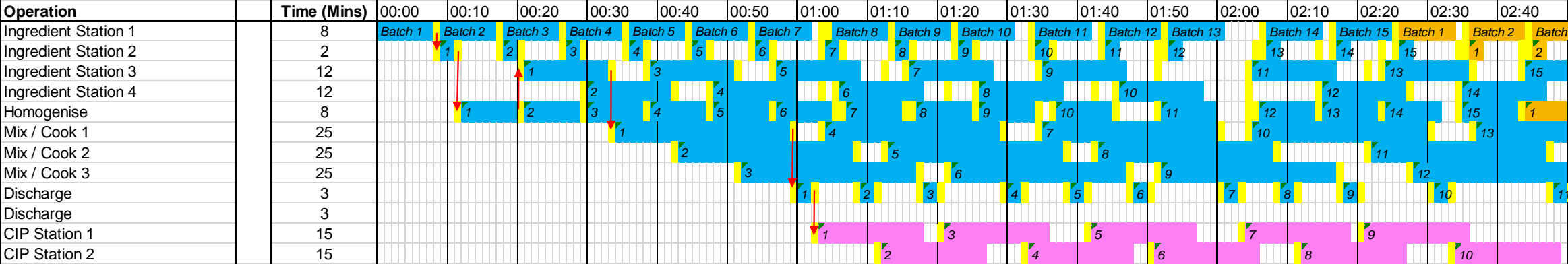
Manufacturing cells that are:

- Modular.
- Flexible.
- Unmanned.



Linear to parallel process

Flexible manufacturing



Making it a reality

- New development at the National Centre for Food Manufacturing, UK.
- Dedicated food grade hall for system, to be operational December 2015.
- Food is life open innovation.



Opportunities

Staying ahead of the curve

- Collaborative research.
- Commercial opportunities.

Contact details:

Jake Norman

Jake.norman@oalgroup.com

+44 752 532 4533

www.oalgroup.com

www.foodis.life

