



# Introduction to Arran Chemical Company

Chemistry technologies and manufacturing capability



**arran**  
CHEMICAL COMPANY LTD  
A Member of the Almac Group

# Arran differentiators

## Chemistry experience:

- Over 30 years of experience in handling difficult chemistry.
- Modular, flexible, adaptable equipment to suit many processes.
- Flexibility to supply kg to 10's tonnes
- Excellent security of supply record with multi-national partners.

## Technologies:

- Experts in high vacuum distillation, biocatalysis and flow chemistry.
- Experienced in hazardous and controlled material handling.
- Speed of progression from development to bulk production.

## Quality:

- Routinely audited by top pharma companies.
- EU based manufacturer with REACH compliance experience
- ISO compliant and approved by US FDA Food division.
- Excellent health and safety and environmental standards.
- Registered on over 30 Drug Master Files.



ENVIRONMENTAL  
MANAGEMENT

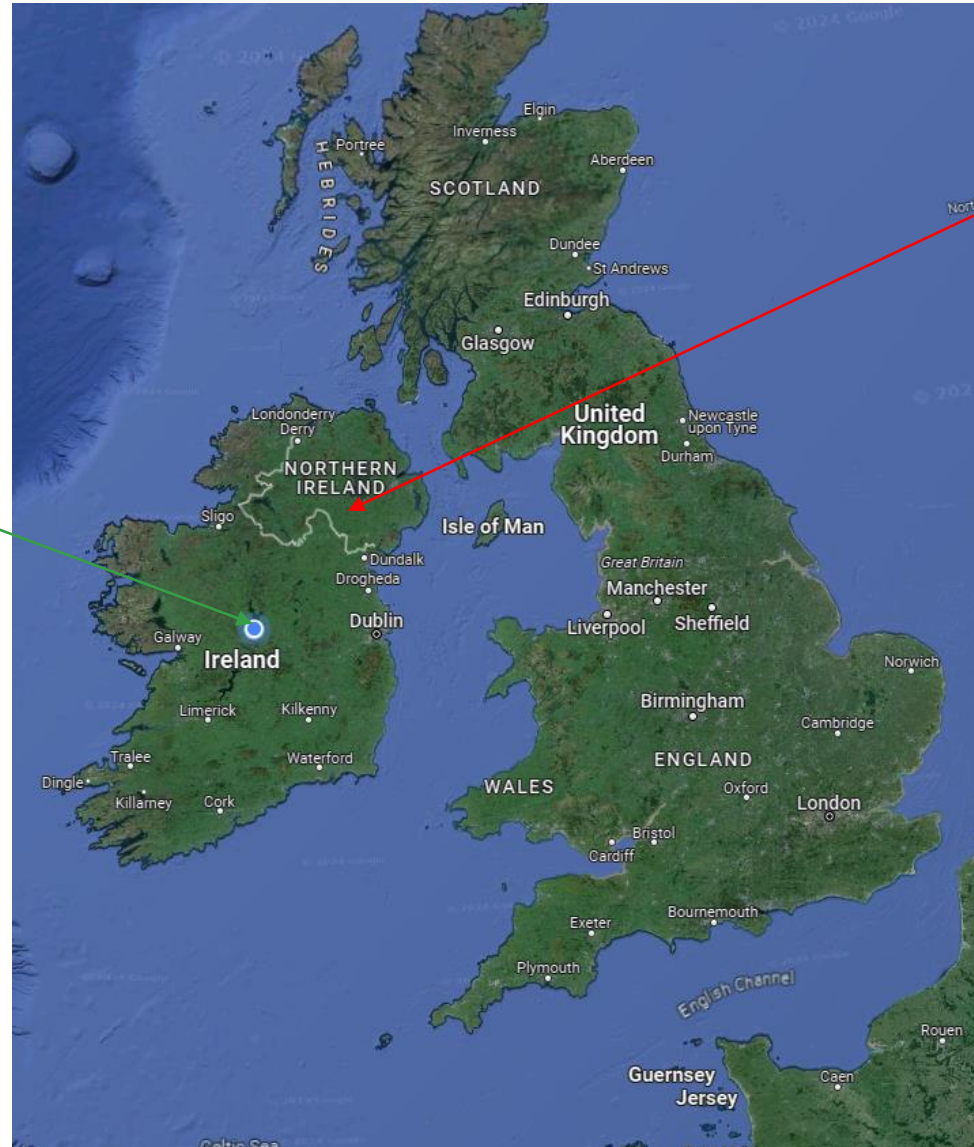


QUALITY  
MANAGEMENT

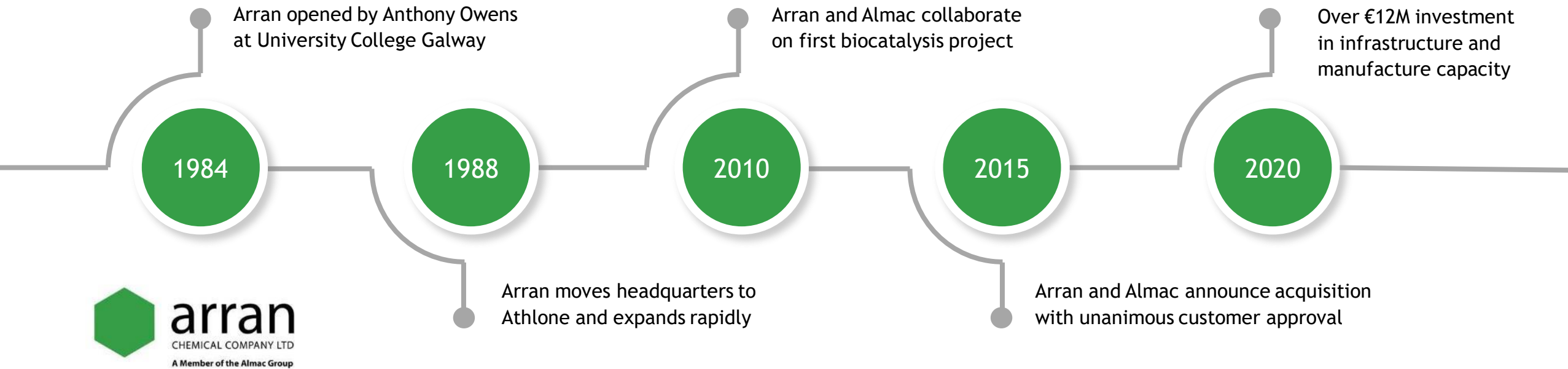


AUDITED BY  
HUMAN FOODS

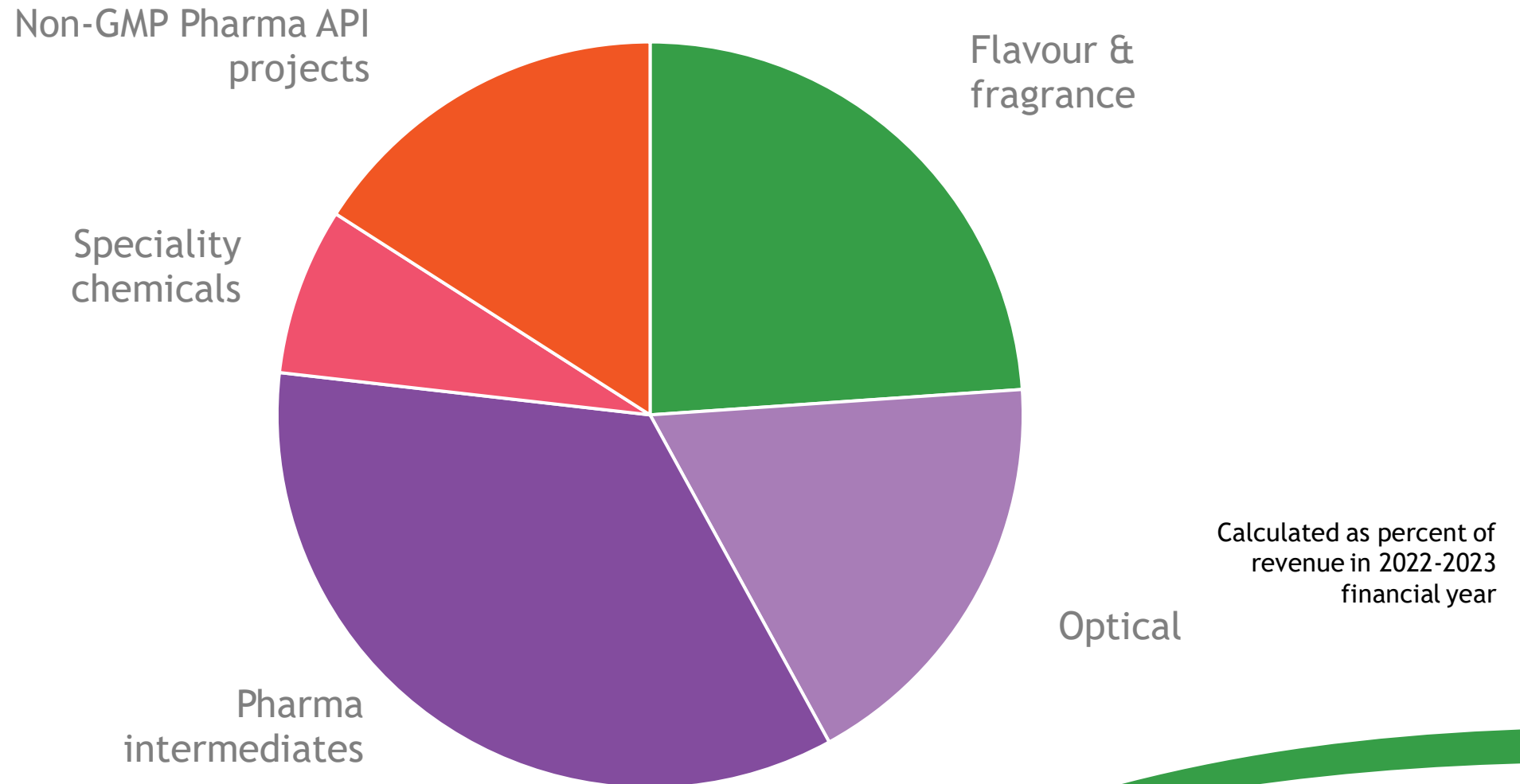
# Location



# History



# Arran Chemical Company client base

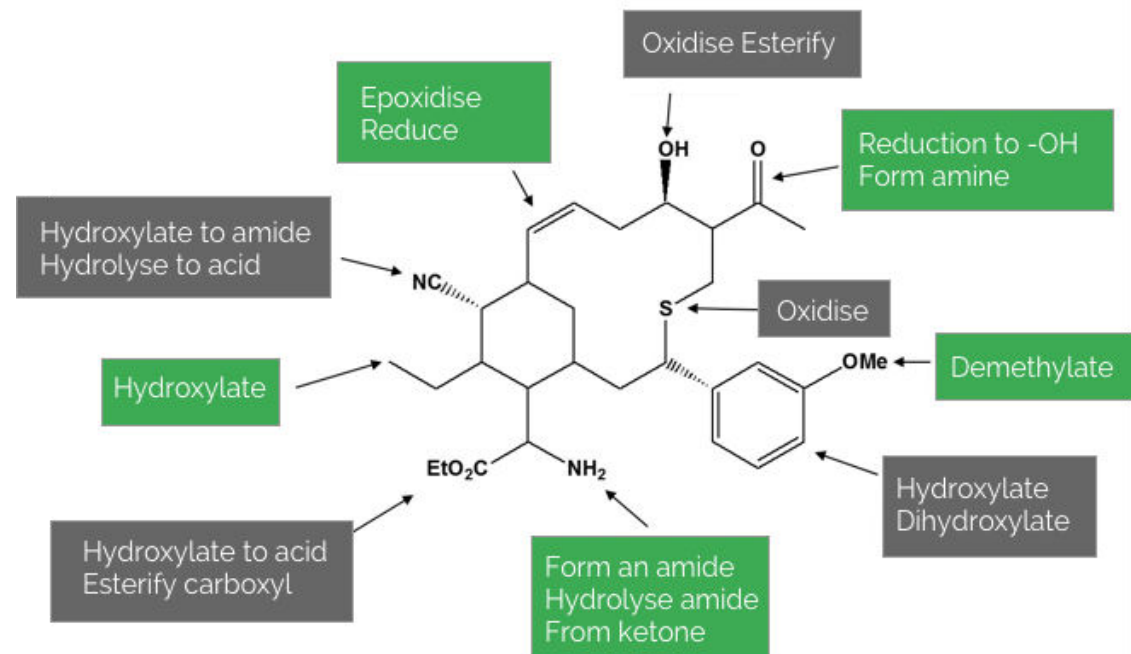


# Core technology 1: Chemistry experience

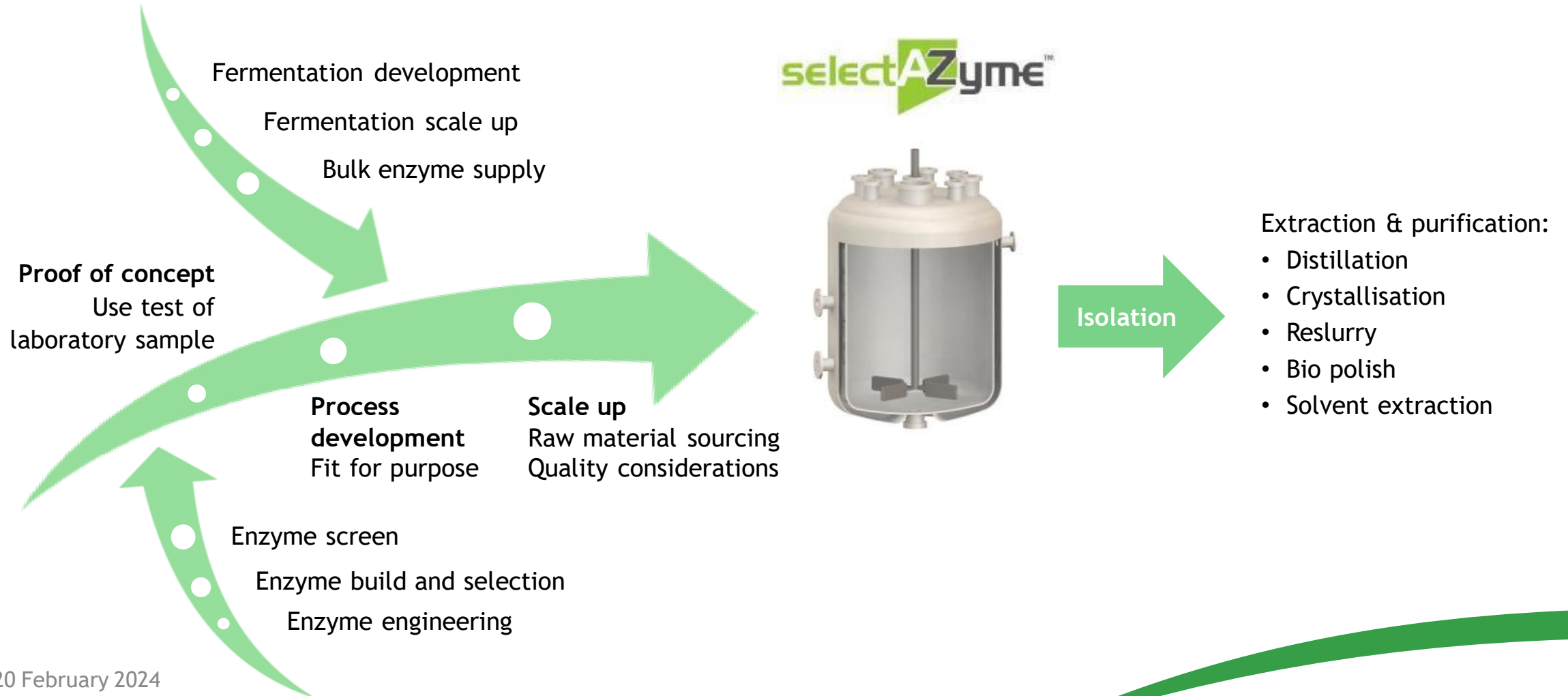
## Classical:

Alkylation	Methylations
Aminoalkylation	Michael reaction
Asymmetric synthesis	Optical resolution
Condensations	Organometallic
Dealkylation	Organosilicon
Dieckmann condensation	Oxidation
Diels Alder reaction	Methacrylate chemistry
Grignard reactions	Ritter reaction
Heck reaction	Stereo-selective reactions
Leuckart reaction	Suspension polymerisation
Mannich reaction	Transfer hydrogenation

## Enzymatic:



# Core technology 2: Biocatalysis



# Core technology 3: distillation

- Distillation of thermally sensitive materials
- Falling film, thin film and short path
- Up to 200 L per distillation

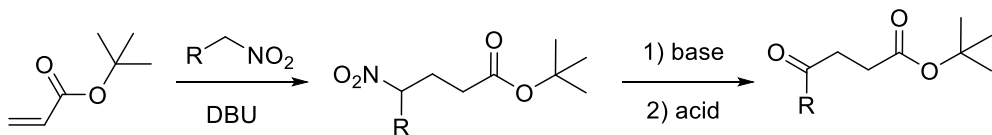
Vacuum	Down to 1 mbar
Output	Up to 15 kg per hour
Materials	Stainless steel and glass lined

- Arran has three falling film distillation units





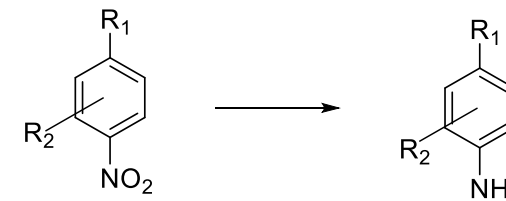
# Core technology 4: Flow chemistry



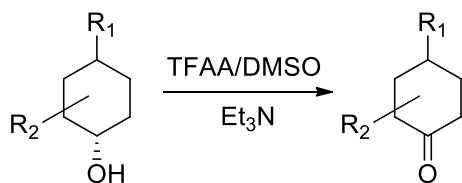
Michael addition  
Nef reaction

High  
Energy

High  
Pressure



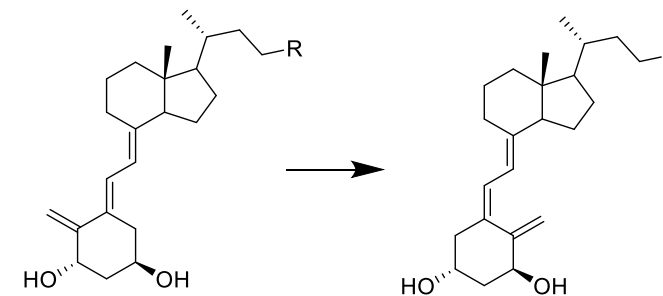
Catalytic  
hydrogenation



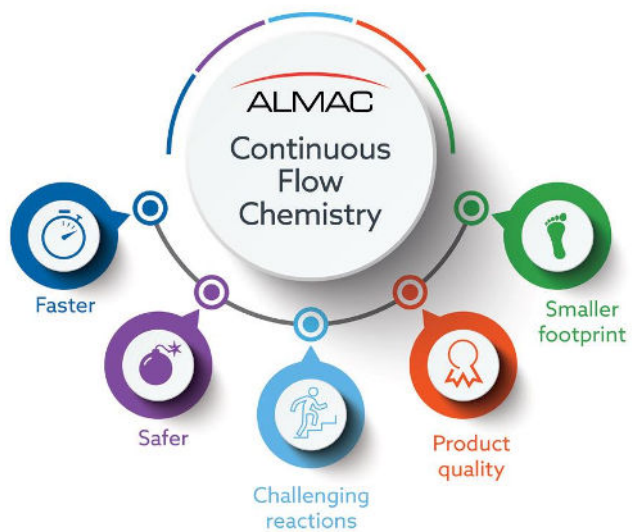
Moffatt Swern

Oxidations

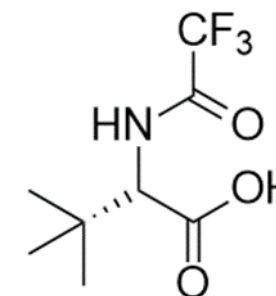
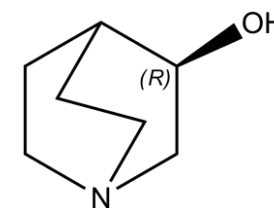
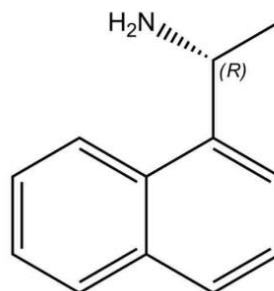
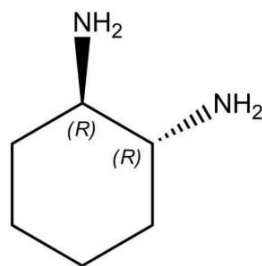
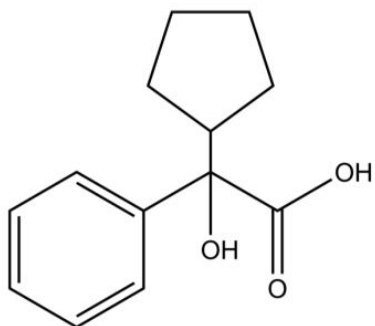
Photo  
chemical



Isomerisation



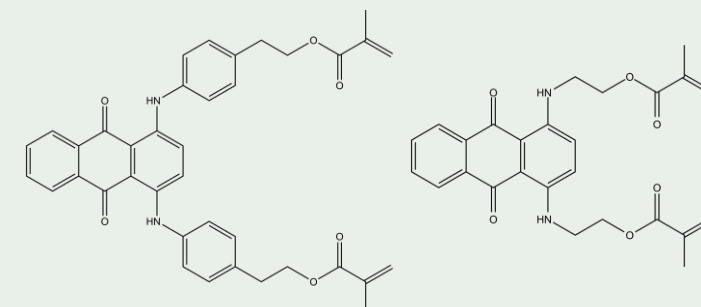
# Case study 1: Regulatory starting materials



Cyclopentyl mandelic acid (and derivatives)	(R,R)-(-)-1,2-Diaminocyclohexane (and diastereomers)	(R)-(+)-1-(1-Naphthyl)ethylamine (and enantiomer)	(R)-(-)-3-Quinuclidinol	PFCT
Glycopyrrolate (peptic ulcers)	Oxaliplatin (oncology)	Cinacalcet (hyperparathyroidism)	Ibiglustat (liposomal disease)	RSM for Plaxovid (COVID-19 treatment)
Hazardous Grignard chemistry	Classical chiral resolution	Leuckart chemistry	Biocatalysis technology	Trifluoroacetamide Formation
Maximum output: 12,000 kg per annum	Maximum output: 30,000 kg per annum	Maximum output: 20,000 kg per annum	Maximum output: 25,000 kg per annum	Maximum output: >25,000 kg per annum

# Case study 2: Products for optical industry

Monomers  
Monomers, Co-polymer  
and Reactive Blue dyes



RB246

RB247

## Case study 3: iLipase beads



- Lipase enzyme immobilised on methacrylate polymer beads
- Process development on bead formation (polymerisation) and enzyme immobilisation
- Three clinical trials batches successfully scaled up
- Approximately 15,500 kg commercial batches manufactured

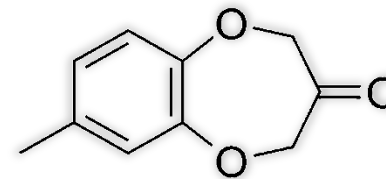


# Case study 3: iLipase beads- Dedicated Facility



# Case study 4: Fragrance Products

- Calone (Watermelon ketone) CAS 28940-11-6
- #1 EU manufacturer
- An intense marine aromatic note with floral overtones manufactured by Arran in Ireland
- (European Union) to industry leading quality and environmental standards.
- Over 30 years of experience in production at Irish headquarters for the fragrance sector.
- “Just-In-Time” supply from 25 kg to multi-tonne with short lead times.
- Heavily audited quality control systems including organoleptic evaluation:
- Ultra-high chemical purity and industry leading odour profile.



# Manufacturing Facilities

## Multi-purpose Pilot Plant

- 7 reactor vessels 100 - 1000 L in size (26- 265 US Gal)
- Total capacity of 2600 L (700 US Gal)
- Glass lined steel, Hastelloy, stainless steel

## Manufacturing Plant

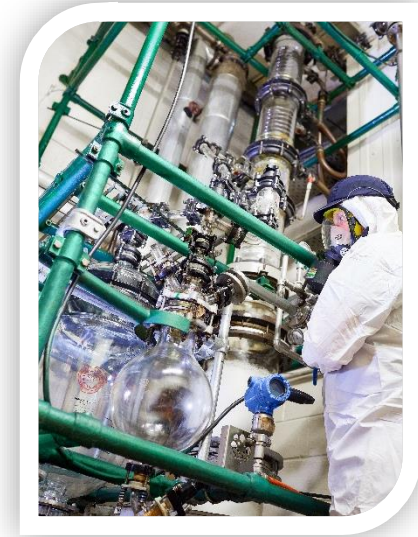
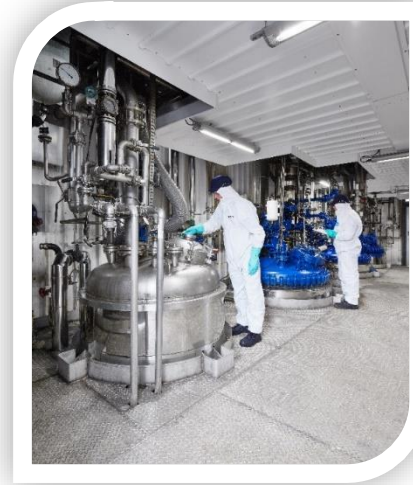
- 16 reactors from 2200 to 8,000 L (550-2113 US Gal)
- Total capacity of 85m<sup>3</sup>(22500 US Gal)
- Glass-lined, Hastelloy & stainless steel
- -40 °F to approx 400 °F

## Work-Up

- Centrifugation from 1.0 to 2.5 tonne
- Driers: 0.5 to 0.6 tonne
- Filtration

## Others

- Hydrogenation
- Flow
- Powder processing equipment
- Containment
- Mobile Equipment



# Protein purification

Ultrafiltration/diafiltration (UF/DF)  
and column chromatography/ion  
exchange





# Containment of potent/hazardous materials

- Experienced in processing potent/hazardous materials
  - OEL/OEB level 3-4: 5-20  $\mu\text{g}/\text{m}^3$  over 8 hour period
- Covering these operations:
  - Vessel charging and discharging
  - Centrifuge charging and discharging
  - Drying, packaging and cleaning
- Custom designed on demand with local supplier of containment solutions
- Specification and sourcing of appropriate flexible containment liners and disposable FIBCs.
- Full hood respirator systems and related PPE for operators.
- Training of operators on containment handling techniques.



# Environmental and sustainability overview



1

Accountable waste stream processing

2

Strict control of gaseous emissions

3

Responsible Care<sup>®</sup> programme

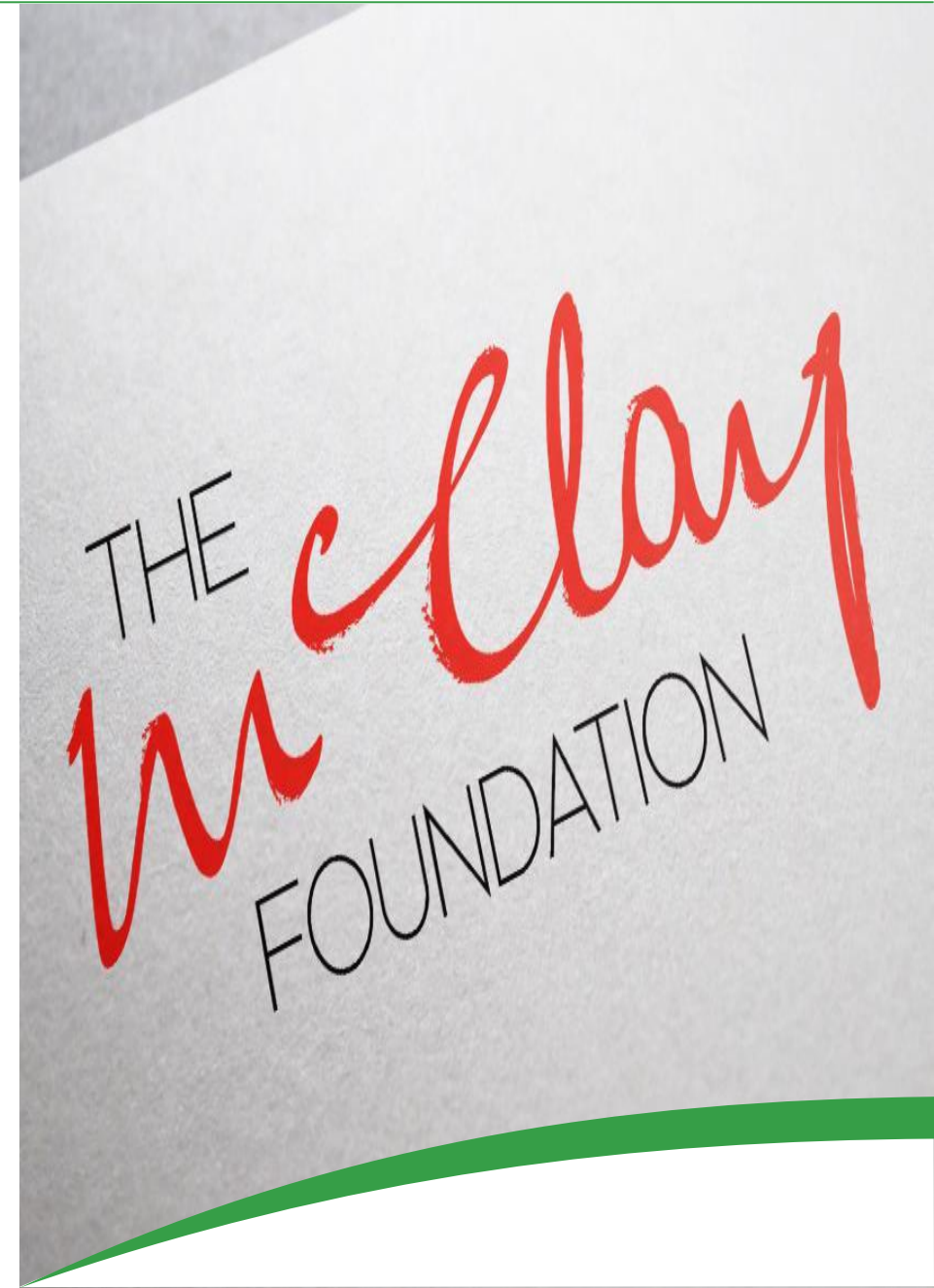
4

Sustainable manufacture



## Ownership of Arran

- The McClay Foundation exists to make advancement in human health.
- The McClay Foundation cannot be sold, merged or split for up to 100 years.
- Arran Chemical Company seeks to build long term supply relations with its client base.



## Summary

- Arran builds long term relationships with companies to develop and manufacture challenging fine and speciality chemicals
- At present, manufacturing capacity is available at short notice - this presents an excellent time to partner.
- Arran welcomes visits/audits of our headquarters in Athlone, Ireland.

## Contact



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