Technology Gap

Reconstitution properties of powders are important to consumers/patients, as they expect to be able to add water to a powder and observe a homogeneous rehydrated liquid. With infant milk formula (IMF) the expectation is that the rehydrated liquid will resemble milk and any undesirable changes in stability e.g. flecks, indicate low quality. The reconstitution properties of a powder mixture impact both perceived and real Quality.

Currently, reconstitution of a powder mixture is assessed manually by using visual inspection and a subjective scoring system. Obviously, this lack of available technology leads to operator variability (e.g. different speeds, patterns of motion etc.).

What is required is an accurate, repeatable and robust method for determining rehydration properties of powders.

Teagasc Solution

ReBot™ is a completely automated test platform system comprising of a dual arm robot (for performing repeatable movements similar to humans) with an integrated vision system for analysing samples post reconstitution (for detection of undesirable properties i.e. foam / sediment), which will give repeatable and accurate values.

Advantages

1. **Standardisation:** First ever automated test system for powder reconstitution. (No operator variability, subjective assessments).
2. **Process Integration:** Applicable to in-process testing (PAT), finished product QC, and development stages.
3. **QbD:** Allows reconstitution to be a CQA (critical quality attribute).
4. **Regionalisation:** Fully programmable so it allows assessment based on regional norms of customer mixing; European vs Chinese IMF mixing.

Target Market

Ireland is host to three major infant milk formula (IMF) companies (Abbott nutrition, Wyeth Nutrition and Danone), resulting in 10% of the world’s IMF being manufactured in Ireland. Additionally our native dairy processors are currently embarking upon a broad scoping investment strategy to upgrade their process infrastructure to manufacture both IMF ingredients and finished recipes for international markets.

Potential Business Models

Currently assessing two main commercialisation routes:

- **Licensing to an existing company**
  Manufacturing and marketing performed by pre-existing company in the field of manufacturing testing, e.g. InnoPharma or similar.

- **Spin-out company**
  Teagasc spin out company:
  - Manufacture and marketing of ReBot™
  - Consultancy service
  - Product Testing service

Progress to Date

IP relating to tooling design and software has been protected through relevant disclosure forms.

Seven-axis versions assembled and robotic movements evaluated and validated.

Vision system and software is under evaluation for detection of undesirable reconstitution of a range of powders.

Future Work

Expand validation of ReBot™ on different IMF powders.
Expand robotic movements to replicate different human reconstitution movements.
Assemble and assess single-arm version.

Further Information:

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