8. BISIGODOS

"... And it really is informing how we think about designing our projects for different calls, trying to incorporate some form of RRI into most of our grant proposals that we're putting into the future. So I think what I'm learning is a greater appreciation of what RRI is, and how best to implement it in the future."

Stuart Coles
Assistant Professor
Warwick Manufacturing Group

The Project and the technology

The EU project BISIGODOS aimed to identify ways to use algae as a feedstock in order to produce valuable chemicals, amino acids and high added-value bio-resins that would normally be produced using petrochemicals. The algae biomass can be fed directly with CO2 from industrial emissions (cement, steel factory, thermal power plants, etc.) as a raw material that is cost-effective and renewable. The process is assisted by solar radiation, nutrients and sea water microalgae. The consortium brought together expertise and resources within the areas of: microalgae and photo-bioreactors production and optimization, manufacture of amino acids for food products, production of conductive polymer coatings, bio-resin development for water-based inks, bio-surfactants production and bio-PU adhesives manufacturing, and end-users in the food, flexible packaging, hair care, metal industry and paints products. The project's website is at www.bisigodos.eu.

Working with BISIGODOS

The BISIGODOS project itself was completed in April 2017. The work carried out with Warwick involved continuing to examine RRI issues with the researchers and businesses including discussion of their next steps and what lessons can be learned more broadly. The work provided an opportunity to assess its overall arc and what might be learned from its outcomes, especially bearing in mind possible future projects.

The project was structured in such a way that industry consortium members would provide specifications of products to be created from the algae. Thus, the project's public deliverable D1.2 puts the requirements list in the following way:

> *Some of the material property requirements provided by the end users are the following (numerical requirements are not shown due to confidentiality requirements)*
>
> **Table 3. Material Property Requirements.**
>
> | Property of algae-based polyols | |
> |---|---|
> | Physical form | Acid number |
> | Functionality | Viscosity |
> | APHA Colour | Moisture |
> | Density | Odour |
> | Heavy metals | Appearance |

It became clear from discussion with those involved in the project that this arrangement put a significant degree of control in the hands of the industry consortium members, to the extent that late term alterations in requirements would lead to development that may not be ideal in sustainability terms. The technology is at a relatively early stage and there is value in allowing experimentation with different forms that it may take. Nonetheless, it seems that in this case the high degree of confidentiality of the material property requirements and the attendant absence of external stakeholder involvement perpetuated an arrangement in which considerations of immediate commercial strategy

3a. Hair care applications (CRODA)

3b. Inks for painting packaging applications (SUNCHEM)

3c. ANTICORROSIVE PIGMENT COATING APPLICATIONS (BECKERS)

3d. PU adhesives for flexible packaging (CUSA)

3e. Ameno acids for food and consmetic applications (GBR.AT)

received a great deal of weight. More specifically, an issue for RRI purposes is the use of a bleaching process to create transparent rather than green packaging products. The structure of the consortium — which itself was a response to a funding call (for further discussion of this point see the section on public private partnerships in chapter 1 of this report) — in this way led to the development of a technology that paid less due than it might have to the value of sustainability.

Advice

There are two central lines of advice arising from our involvement with the researchers.

1. Seek to find ways from the outset for projects in general and technology assessment practices in particular to be deliberately stakeholder-engaged

It is typical for those working under the rubric of RRI to propose greater stakeholder engagement. The BISIGODOS project provides no exception. Greater efforts might be made (in ways that pay due attention to issues of commercial sensitivity) in the material requirements process to consult the following, amongst others:

- consumer groups
- other industry actors
- policy makers.

There may be challenges in achieving such engagement regarding resources, expertise, framing effects and capture, and commercial sensitivities. However, it is clear from the recent broader developments in RRI that there are various avenues that will partially or fully meet such challenges.

2. Broaden the range of technology assessments

The Life Cycle Assessment and value assessments carried out on BISIGODOS were:

A. confidential
B. made at the very end of the project
C. carried out with the more standard attributive methodology
D. run separately for each of the products being produced.

Insofar as RRI is being addressed, the assessments could be improved in each of these regards. Public assessments would facilitate the above-described stakeholder process. So-called 'anticipatory' assessments of technology at the start of a project may be speculative but can help its subsequent direction and can make explicit the reasoning of researchers to stakeholders. While Attributional Life Cycle Assessment is the standard, there is an increasingly sophisticated set of assessment methods that seeks to take into account economic or social value and indeed to draw out the values that are implicit in those carrying out the research. Finally, the Life Cycle and Value Assessments were carried out on the assumption that each product separately (surfactants, coatings, and so on) would be produced; it would be worthwhile also to see such assessments on the wider assumption that algal oils replaced petrochemical feedstocks in the economy more broadly.