

# Innovation challenge

## Sodium phosphate

### From residual stream to circular application



At FrieslandCampina's production site in Bedum, large volumes of milk are processed every day into cheese and high-value ingredients for infant nutrition. This process generates several side streams. One of these streams arises during the removal of phosphate from process water, a necessary step to comply with environmental legislation and to reduce the load on the wastewater treatment system.

This is an industrial residual stream that is generated continuously and transported off-site by truck. The residual stream consists of approximately 60% water and 40% other components, including sodium phosphate and organic constituents. See Table 1 for a more detailed overview of the composition of the residual stream.

The residual stream is currently processed in a reliable manner, within the applicable operational and regulatory frameworks. At the same time, FrieslandCampina wants to explore whether this stream can be utilised in a more high-value way. This shifts the focus from processing to valorisation.

FrieslandCampina is actively working to make its production processes more sustainable and continuously explores how residual streams can be reintroduced into valuable value chains. From that ambition,

FrieslandCampina aims not only to comply with laws and regulations, but also to take the lead in developing circular solutions. FrieslandCampina is therefore looking for innovative technologies and applications that can enable this sodium phosphate-rich residual stream to be utilised in a high-value way that is both technically and economically feasible.

Citrate	41%
Sodium	23%
Phosphate	21%
Chloride	3%
Lactose	3%

pH	7.0
----	-----

**Table 1 – Indicative composition sodium phosphate stream (% on dry matter basis)**



### The challenge

**How can FrieslandCampina's NaFos residual stream in Bedum be utilised in a high-value way in one or more applications, with or without limited pre-treatment?**

### Call for solutions

Current and previous explorations within FrieslandCampina into the valorisation of the NaFos residual stream have focused primarily on opportunities within the agrifood domain, where FrieslandCampina has knowledge, expertise and an established network. These initiatives have generated valuable insights, but so far have not resulted in a robust business case. In addition, FrieslandCampina is explicitly looking beyond its own sector and is open to new perspectives, applications and value chain collaborations with other industries. As innovative applications often emerge at the intersection of different sectors.

Does your organisation have an application in which FrieslandCampina's NaFos residual stream can be utilised in a high-value way? FrieslandCampina invites startups, scale-ups and innovative SMEs to submit a proposal for this innovation challenge. Apply now and work together with FrieslandCampina on a sustainable solution. After the first selection round, the top candidates will be invited for an introductory meeting and site visit at FrieslandCampina in Bedum. After the match, the winning party will have the opportunity to further explore collaboration with FrieslandCampina.

# Assessment criteria

A strong solution for FrieslandCampina's innovation challenge meets - as many as possible of - the criteria below.

## 1. Solution for the full residual stream

The solution must contribute to the complete and structural processing or utilisation of the NaFos residual stream. If a solution utilises only one or several components of the stream, the submission must demonstrate how the remaining fraction will be processed. This can be done through:

- a joint submission with a partner that utilises the remaining part; or
- a concrete collaboration proposal with a party that can process the remaining part.

Solutions that create a new residual problem or result in waste displacement fall outside the scope of the challenge.

## 2. High-value and sustainable application

The solution converts the NaFos residual stream into a sustainable and valuable application. This means that:

- the application has a clear function within an existing or new value chain;
- the solution demonstrably contributes to sustainable use of raw materials;
- transport, processing and application as a whole are sustainably feasible.

## 3. Fit with the volume of the stream

The solution must be able to process or absorb the available volume on a structural basis. More detailed volume indications are available upon request and will be shared under NDA with parties selected for a next phase of the process.

## 4. Technological maturity

The solution must be based on a technology or application with a Technology Readiness Level (TRL) of at least 6. This means the technology has already been tested in a relevant environment and can realistically be scaled up to industrial application.

Pilot or test activities at the Bedum site may be explored in consultation. This may create room to test processing steps or applications in practice before further scaling takes place.

## 5. Realistic business model and market application

The solution must be based on a realistic business model aligned with a clear market application.

The submitting party must be able to substantiate:

- which market the application serves;
- who the customers or users are;
- what experience or position the submitting party has within this market or value chain.

## 6. Legal feasibility

The solution must comply with relevant European and Dutch laws and regulations, as well as with the environmental permit applicable to the production site in Bedum.

The submitting party is responsible for demonstrating the legal framework applicable to the proposed solution.

## 7. Collaboration model

FrieslandCampina is looking for partners that can realise an application in which the residual stream is utilised, with the organisation acting as supplier of the residual stream. Depending on the solution, different forms of collaboration may be explored.

