

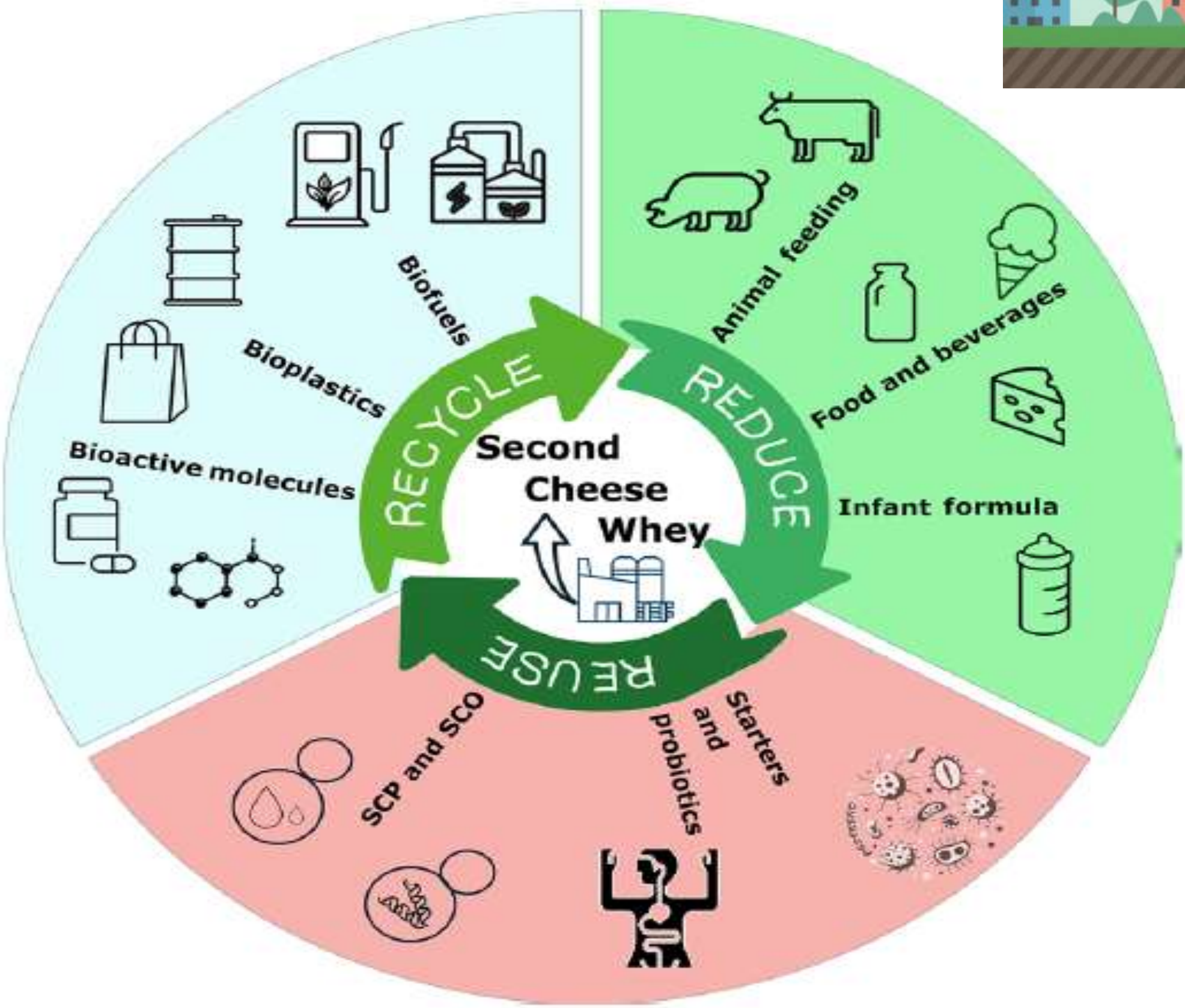
STUDIES ON THE PRODUCTION OF NOVEL FERMENTED DRINKS FROM SWEET WHEY

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Introduction

Whey is a significant environmental contaminant since its waste load is estimated to be 100–175 times more than that of an equivalent volume of household wastewater. It is estimated that around half of the whey produced is used for human or animal use, and the other half is released into the environment as waste water, which adds to pollution. Thus, in accordance with the guidelines established by the EU Green Deal Program, its valorisation through the development of health-promoting products is an important step for the environment and the food sector. Numerous whey-based beverages are mentioned in the specialized literature. Wine-like beverages can be made by fermenting whey with different kinds of yeasts, producing liqueur-style drinks, a drink with an alcohol concentration of 10–14% etc. The purpose of the research was to obtain fermented drinks from deproteinized whey, endogenously impregnated with CO<sub>2</sub>.



Fancello *et al.*(2024). Unlocking the potential of second cheese whey: a comprehensive review on valorisation strategies. *Reviews in Environmental Science and Bio/Technology*,1-31.

Research

The technological process of production was similar to that for obtaining bottled sparkling wines. The finished products were analyzed from a physical-chemical and sensory point of view after the period of fermentation in bottles and maturation. The obtained results are summarized in table 1 and table 2. According to the researchers, using deproteinized whey to make various drinks not only gives them a unique flavour but also helps the beverage sector be more sustainable by using a valuable component and cutting down on food waste.

Conclusions

The obtained products are part of the category of effervescent alcoholic beverages, the composition of which includes only natural ingredients: whey, berry syrup, without the addition of food additives. The uniqueness of the products consists in the use of deproteinized whey, a by-product resulting from the whey cheese industry when obtaining an effervescent alcoholic drink. With an original recipe, the new assortment of alcoholic drink presents special sensory characteristics, unmistakable freshness, flavor given by the berry syrup from the manufacturing recipe and perlage, conferred by the carbon dioxide of endogenous origin resulting from the alcoholic fermentation. In conclusion, whey is a by-product, multipurpose product that may benefit the environment and human health if it is produced responsibly. As a result, it's critical to assess how whey is processed into products and derivatives while also creating techniques that reduce the impact on the environment. Expanded markets for sustainable manufacturing may result from the various strategies being developed to profit on whey through food products. To fully comprehend the potential and constraints of these technologies on an industrial scale, more research is frequently required.

Results & Discussions

Research has shown that it is possible to obtain high-quality deproteinized whey alcoholic beverages, sparkling, naturally impregnated with CO<sub>2</sub> and with an alcohol content that varied between 12.14% v/v and 13.10% v/v. The alcohol content of the new obtained drink is high, similar to that of wine. Moreover, and due to the high CO<sub>2</sub> content, these new drinks are very similar to sparkling wines obtained by the fermentation method in bottles (Champenoise method). According to our data, all drink samples were liked by the panellists from “like slightly” to “like very much”; mean general acceptability score ranged between 6.41 and 8.52 All the drink samples were very well appreciated for carbonatation which means value ranged between 8.02 and 8.54. This fact was explainable that there was enough fermentescible sugar to lead to an appreciable amount of carbon dioxide. Sample V3 was the most appreciated one, receiving the highest score for sensory characteristics appearance, aroma, general taste, carbonatation, body and general acceptability.



Table 1

Physical-chemical properties of deproteinized whey drink

Characteristic	Deproteinized whey drink recipe variant			
	V1	V2	V3	V4
Density, g/cm <sup>3</sup>	1.0198±0.002	1.0200±0.004	1,0207±0.002	1.0214±0.002
Apparent extract, % m/m	5.28±0.02	5.66±0,06	5.71±0.02	5.44±0.04
Alcohol content, % v/v	12.14±0.02	12.80±0.04	13.10±0.04	12.32±0.02
Real extract, % m/m	9.70±0.04	9.48±0.05	9.86±0.02	9.90±0.02
Final degree of fermentation, %	79.08±0.75	79.80±0.76	81.20±0.74	79.38±0.82
CO <sub>2</sub> , g/L	4.28±0.02	4.56±0.03	4.84±0.02	4.90±0.04
pH	4.96±0.02	5.02±0.01	5.04±0.02	5.00±0.01

Results represents mean values ± standard deviation (SD), n=3

Table 2

Sensory characteristics of deproteinized whey drink

Characteristic	Deproteinized whey drink recipe variant			
	V1	V2	V3	V4
Appearance	7.04±1.18 <sup>c</sup>	7.06±0.33 <sup>b</sup>	8.60±0.13 <sup>e</sup>	6.82±1.03 <sup>b</sup>
Colour	6.12±1.40 <sup>b</sup>	6.71±0.23 <sup>a</sup>	7.96±0.57 <sup>bc</sup>	8.10±0.23 <sup>d</sup>
Aroma	6.67±0.33 <sup>d</sup>	6.83±0.14 <sup>a</sup>	8.32±0.18 <sup>d</sup>	8.21±0.77 <sup>c</sup>
General Taste	6.82±0.21 <sup>d</sup>	6.82±0.15 <sup>a</sup>	8.36±0.22 <sup>e</sup>	8.12±0.30 <sup>c</sup>
Carbonatation	8.02±0.18 <sup>bc</sup>	8.31±0.11 <sup>a</sup>	8.54±0.09 <sup>c</sup>	8.52±0.18 <sup>bc</sup>
Body	7.02±0.25 <sup>c</sup>	7.06±0.95 <sup>a</sup>	8.21±0.24 <sup>d</sup>	7.31±0.34 <sup>b</sup>
Mouthfeel	7.01±0.53 <sup>c</sup>	7.22±0.77 <sup>a</sup>	8.08±0.57 <sup>c</sup>	8.13±0.25 <sup>b</sup>
General acceptability	7.01±0.20 <sup>d</sup>	7.41±0.82 <sup>a</sup>	8.52±0.36 <sup>d</sup>	8.42±0.77 <sup>c</sup>

Data are expressed as mean ± standard deviation. <sup>a-d</sup>- mean values in the same column followed by a different letter are statistically different (p < 0.05)