Turning Apparent Waste into New Value: Up-Cycling Strategies Exemplified by Brewer's Spent Grains (BSG)

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Background: The production, distribution, consumption, and removal of food produces a wide range of organic by-products and, eventually, waste. This kind of waste not only places a considerable burden on the environment and food economy, it also represents an opportunity to harvest additional value, often within an unexpected context and with little connection to the original food item it originates from.

Objectives: Brewer's spent grain (BSG) is such a waste material produced in considerable quantities as a by-product of the beer industry. Although traditionally discarded or fed to animals, it is rich in a wide range of interesting biomolecules and can be converted into a wide spectrum of valuable products.

Results: Traditional and more innovative applications of BSG illustrate the concept of up-cycling in the food industry. With the relevant scientific and engineering base in place, BSG can be turned into a range of valuable products such as Brewer's vinegar, creams, high-fibre bread, grain burgers, bioplastics, and pellets.

Conclusion: In the medium term, rather than composting BSG for biogas or feeding it to animals, it may be seen as a valuable raw material to inspire various small- and medium-sized local industries and bedrock of an entire industry.

Keywords: Brewers' burgers, brewer's spent grains (BSG), functional food, dietary fibre, bioplastic, brewer's vinegar, up-cycling.