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Editorial

Coffee By-Products: Still Underexplored Resources

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Food security and food sustainability are, nowadays, two concepts that have been gaining increasing attention and dimension. The need to guarantee food for all and produce food products using sustainable practices (resulting in environmental, social and economic benefits) has been changing the way food industries see their wastes and profits.

Today, an increasing number of food companies want to explore their by-products, using them as a whole or extracting bioactive compounds to produce innovative food products, with new or different functionalities and properties. And this has also been changing the way consumers see what they eat and what they buy.

Coffee is one of the most popular beverages worldwide. According to the International Coffee Organization, in 2019/2020, the total world coffee consumption will achieve 169 337 thousand 60 kg bags (http://www.ico.org/prices/new-consumption-table.pdf). In parallel with the increasing production, each year, tons of coffee wastes and by-products are generated and discarded, constituting a serious environmental problem. In order to increase the sustainability of the chain, it is crucial that industries can apply strategies to valorize the by-products that result from coffee processing, simultaneously creating an opportunity to raise economical incomes and offer new jobs.

Coffee by-products include those that result from post-harvesting processing, roasting and beverage preparation. Immature fruits, defective beans, husks, skin and pulp, parchment, silver skin and spent coffee grounds are the main components of the group.

All coffee by-products are rich in many bioactive compounds with potential applications in different fields. They can be used for energy production and composting, but several examples can be found in literature in which researchers suggest their incorporation in feed, foodstuffs, or even in cosmetic products.

Although the high content in tannins in some of them (e.g. immature fruits) can limit their use for food or feed purposes, in general, all these by-products are rich in valuable compounds for nutritional applications, such as caffeine, minerals, fiber or chlorogenic acids (being 5-caffeoylquinic acid the major phenolic). The antioxidant, anti-inflammatory and anti-diabetic potential properties of this last group of compounds are also well known.

Although all these coffee by-products can foresee new applications, a lot still need to be done by industries and researchers to accomplish them in practice. The high perishability of some of these by-products and the high costs for selection, transportation and transformation, for example, are real challenges to surpass, and integrated strategies are still needed to be developed. Nevertheless, some cases of success can already be found in the market - see the company Bio-bean (https://www.bio-bean.com/).

Scientists have here a great opportunity to help industries in finding new strategies. The biggest challenge will be to fulfill the gap between the laboratorial studies and the expansion to a larger scale, maintaining the feasibility of the processes!

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