Coffee by-products may have prebiotic, antimicrobial and antioxidant potential

Researchers from the University of Granada in Spain have suggested that more than two billion tons of coffee by-products - including coffee grounds (CSG) and silverskin (CS) - that are currently destined for landfill globally could provide value-added ingredients and processing agents for the food and nutrition industry.

Writing in the journal *LWT – Food Science and Technology*, the team demonstrate the powerful antioxidant and antimicrobial properties of CSG and CS – adding that the by-products are also a rich source of prebiotic fibres and phenols.

Indeed, the team noted that the antioxidant effects of coffee by-products were found to be 500 times greater than vitamin C.

"They also contain high levels of melanoidins, which are produced during the roasting process and give coffee its brown colour. The biological properties of these melanoidins could be harnessed for a range of practical applications, such as preventing harmful pathogens from growing in food products," said Professor Rufián Henares, who led the team.

However, he noted that since the by-products also contain beneficial prebiotics, then in order to harness the beneficial effects of both they would need to be separated so that they do not interfere with each other's beneficia properties.

"Coffee by-products such as coffee spent grounds and coffee silverskin could be used as a source of new functional ingredients, due to their relevant effect over the gut microbiota," wrote the team.

"However, they should be provided in a separate manner because of interference between the prebiotic and antimicrobial activity of CSG and coffee melanoidins."

Study details

Rufián Henares and his colleagues set out to determine the extent to which the by-products could be recycled for nutritional purposes, thereby reducing the amount of waste being generated, as well as benefitting coffee producers, recycling companies, the health sector, and consumers.

Their findings indicate that the antioxidant effects of these coffee grounds are 500 times greater than those found in vitamin C and could be employed to create functional foods with significant health benefits.

"We show the prebiotic, antimicrobial and antioxidant capacity of CG and CS, as well as those melanoidins (a coffee component generated during the roasting process) obtained from the former," wrote the team. *"The prebiotic activity was important in both CSG and CS, although the presence of coffee melanoidins (CM) interfered with such beneficial properties."*

In addition, CSG, CS and CM were highly antioxidant, even their indigestible fraction, which were the most relevant, said the team.

"Finally, we found that the addition of sugar during coffee roasting, namely torrefacto, increased the antioxidant and antimicrobial activity due to a larger generation of CM, although prebiotic activity was not affected," wrote Rufián Henares and colleagues. *"Therefore, CSG, CS and CM should be recycled in order to be used as a source of new food ingredients."*

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"Revalorization of coffee by-products. Prebiotic, antimicrobial and antioxidant properties"
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