

UGM Students Research Coffee Grounds as Osteoporosis Inhibitor

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Osteoporosis prevalence in the world is increasing. Hip bone fracture due to osteoporosis is predicted to increase from 1.12 million in 2018 to 2.56 million in 2050.

Osteoporosis happens due to excessive bone resorption. To reduce the risk of osteoporosis can be done by several ways, including taking supplements that contain ingredients that can prevent bone resorption due to osteoclast differentiation.

UGM Pharmacy students explored natural ingredients abundant in Indonesia as anti-osteoclastogenesis agent to inhibit osteoporosis. Marina Elsaída Harianja, Mila Hanifa, and Ahmad Naufal promoted coffee (*Coffea arabica L.*) grounds that contain compounds and have pharmacological effects to inhibit osteoclast differentiation.

Marina Elsaída Harianja, team chairperson, said at UGM on Monday (19/8) that osteoclast differentiation inhibition can also inhibit osteoporosis. So, coffee grounds that contain chlorogenic acid have the potential to be developed as osteoclastogenesis inhibitor that implicates in inhibiting osteoporosis.

“The research employs in vitro method, osteoclastogenesis is prepared by using macrophagous cell system in the form of RAW 264.7 cells that are induced with osteoclast-differential factor (sODF) or RANKL. The tested sample is ethanolic extract of coffee grounds that is obtained through extraction method with ethanol 70%,” she said.

Marina said the tests confirmed the coffee grounds contain chlorogenic acid compound. Total flavonoid testing showed that ethanolic extract of coffee grounds compound has total flavonoids at 0.33 % (b/b). It is not toxic to RAW 264.7 cell. But in later tests they showed that extract treatment can inhibit osteoclastogenesis process, she said. Furthermore, they found out that chlorogenic acid has better and higher interaction than native ligand.

From the fours aspects of ingredient quality, chemical, biological, and molecular, the potential of coffee grounds extract as anti-osteoclastogenesis can be developed as osteoporosis inhibitor.

The students explained that the ethanolic extract of coffee grounds is formulated into nanoemulsion, based on the acidic chlorogenate which is difficult to enter the lipophilic membrane that causes the low bioavailability.

“Hence, to resolve this weakness, we prepare the nanoemulsion that can increase the bioavailability of chlorogenic acid. It is also practical, easy for consumption, and is coffee aromatic,” she said.

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