Effects of roasting on the profile of bioactives and antioxidant activity of defatted-sesame meal

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Sesame seed is considered a good source of edible oil and it is widely used in bakery and confectionery products. Defatted-sesame meal (DSM), a by-product of the sesame oil industry, has attracted considerable interest in the food industry due to its strong antioxidant activity, although it is mainly used as a feed ingredient or as material to make compost. Roasting is a key step in the sesame oil industry that leads to changes in its organoleptic and quality characteristics. This study aimed to investigate the effect of roasting on the bioactive profile of water-soluble extracts from DSM.
White sesame seeds were roasted for 20 min in an electric oven at different temperatures (180, 200 and 220 °C). Sesame oils extracted from un-roasted and roasted seeds through cold-pressing machine and the respective DSMs were compared for their total phenolic content (TPC), phenolic profile (phenolic acids and lignans), tocopherols, as well as their antioxidant activity after ultrasonic extraction with 60% aqueous methanol for 1 min.
The results showed that the TPC and antioxidant activity were significantly influenced by the roasting temperature, achieving maximum values after roasting at 220 °C for 20 min. However, although total sesame lignans' content was increased by roasting, there were no obvious differences among different temperatures applied. The main lignans identified and quantified in DSM samples were sesaminol triglucoside (SETG), sesaminol diglucoside (SEDG), sesamin and sesamol, while the major phenolic acids present were protocatechuic acid, 4-hydroxybenzoic acid, ferulic acid, p-coumaric acid, vanillic acid and caffeic acid. It was found that roasting decreased the contents of sesamol and phenolic acids, but increased that of sesamin. On the other hand, roasting had no impact on lignans glucosides contents. Moreover, a loss of tocopherols isomers has occurred after heat treatment. These results could be used industrially to obtain high quality sesame by-products which are considered a significant and abundant resource with numerous beneficial nutrients that positively affect human health. However, more work is needed to elucidate the factors that interfere with the formation and disintegration of bioactive compounds present in the sesame seeds during roasting.