

## Abstract

Date seed is a by-product from *Phoenix dactylifera L.* which is a good source of mineral nutrients and phenolic compounds. Despite their many nutritional properties, they are usually discarded. However, roasting provides a low-cost and easy approach to add value to these wastes as “date seed coffee” is popular in Arabian countries. However, along with color and aroma changes, a carcinogenic substance such as acrylamide may also be formed during the roasting process. Due to the possible harms of acrylamide on human health, the present study aimed to evaluate the modified QuEChERS method for the acrylamide determination in various date seeds brews by HPLC-PDA for the first time. Optimization of analytical methods was performed in terms of the type of organic solvent (acetonitrile and methanol), the percentage of organic solvent (10, 5, 3% v/v), and the flow rate (0.1, 0.7, 0.5 mL/min) of the mobile phase. QuEChERS method was also developed and parameters including extraction solvent (acetonitrile, acetonitrile with hexane) and the sorbent (PSA, C18, SAX, Florisil, Aluminum oxide) were optimized. The results indicated that the water/acetonitrile with a ratio of 97:3 and a flow rate of 0.7 mL/min permitted the acceptable separation of the acrylamide peak from the interfering compounds. The usefulness of the QuEChERS method has been verified based on the recovery ratio of acrylamide. The obtained results showed that the best recovery of 103% was obtained using a combination of PSA, SAX, and C18 sorbents with the addition of hexane in the initial step of extraction. The chosen method was applied for the acrylamide determination in various date seeds varieties and their respective brews. Accordingly, acrylamide content in Arabica coffee ( $1825.23 \pm 17.44$   $\mu\text{g/kg}$ ) was significantly higher than those obtained from date seeds varieties. The results of acrylamide content ranged from  $360.99 \pm 4.15$  to  $129.43 \pm 2.37$   $\mu\text{g/kg}$  in different types of date seeds. The highest level of melanoidin was observed in Arabica coffee. In most cases, an inverse relationship was observed between the acrylamide and melanoidin content in roasted date seeds. The study of color parameters revealed that the parameters  $a^*$  and  $b^*$  largely follow the pattern of melanoidin as with increasing the  $a^*$  and  $b^*$  parameters, the amount of melanoidin also increased in the samples.

**Keywords:** Acrylamide, Date seeds, QuEChERS, Arabica coffee, Roasting process, Melanoidins

