

Comparing effect of Egyptian, Saudi Arabian coffee cup preparations on Ochratoxin A and Acrylamide content

Dalal H. M. Alkhalifah

Prince Norah bent Abdulrahman, University, Saudi Arabia

Coffee is one of the most frequently consumed beverages in Arabic area. It is can be contaminated by Ochratoxin A (OTA) besides presence carcinogenic Millard products as Acrylamide during roasting process. Therefore, the present work carried out to trace the potentiality of presence of OTA and Acrylamide in coffee cup after using different methods of Arabic area methods in Egypt and Saudi Arabi. Forty-two samples of Arabica green coffee (*Coffea Arabica* Linn., *Rubiaceae*), were collected randomly from Saudi Arabia besides same number from Egyptian markets, involved green beans, light and dark roasted beans. All samples were tested for identification of natural contaminated fungal species besides OTA and Acrylamide content before and after coffee cup preparations.

The results proved that Egyptian samples were more contaminated than Saudi Arabian samples. Four genes of fungi are present as *Fusarium spp*, *Cladosporium spp*, *Penicillium spp*, *Aspergillus spp*. The dominated one was *Aspergillus spp* which has three varieties as *A. niger*, *A. flavus* and *A. Ochraceus*. Also, two toxigenic molds, belonged to two species as *Penicillium sp.* and *Aspergillus sp.* which occupied high counts from all tested samples, respectively.

OTA-HPLC analysis of coffee beans proved high levels, especially in dried samples which were naturally contaminated with OTA. The highest levels were present in Egyptian samples as 12.4 ppb (light roasting), 11.9 ppb (dark roasting), then Saudi Arabia which contained 10.2, 9.2, 8.5 ppb for green, light and dark roasting respectively. OTA doses were present than the recommended dose (5.0 ppb). Turkish method (Egyptian method), decreased OTA from 12.4 ppb (dried) to 9.1 ppb (for light roasting) while the dark roasted coffee were less (8.6 ppb). Same trend was clear for Saudi Arabia samples which recorded 8.1, 7.1 and 6.5 ppb for coffee cup by the Saudi Arabian methods using natural spices as cardamom, saffron and ginger. Gulf method was the best method for reducing OTA content to 6.4, 4.8 and 3.4 ppb after process to less safe recommended dose. That is due to high level of antioxidants from spices which boiled for short time not long time as Saudi Arabia methods.

GC-MS analysis of Acrylamide proved natural presence in roasted coffee beans in dry samples due to high temperature during roasting. Its content raised than recommended safety levels (0.5-0.8 ppm/weight/daily). Its were observed in dark roasted tested samples, whereas in light roasted was less values. OTA concentrations were in Egyptian light roasted samples were contained 49.9 ppm, and dark roasted 53.4 ppm respectively. Same results were obtained with Saudi Arabian dark roasted after preparing coffee cup with both of two methods a observed in dry samples (94.6 ppm) but decreased little bit to 70 ppm (Saudi methods) and 58.6 ppm (Gulf Area methods). But, the best results were obtained with coffee green beans and light roasted. Whereas, the lowest and healthy coffee cup resulted from light or green beans with Gulf Arabian methods which contained the lowest acrylamide content less than 50 ppm. Besides the Turkish or Saudi Arabian methods with same light roasted samples.

Finally, it could be recommended that using source of antioxidant source in preparation coffee cup decreased the natural toxicity roles as OTA and Acrylamide content.