

Acrylamide in Roast Coffee – Investigations of Influencing Factors

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SUMMARY

After the first publication in 2002 on the presence of acrylamide in food products an initiative within the coffee industry has started to consider a joint investigation on the formation and presence of acrylamide in coffee. This initiative resulted in a major research programme which was executed from early 2003 to mid 2004 with participations of more than 20 companies representing the European coffee industry. The objective of the study was to understand the presence of acrylamide in coffee covering the influence of green coffee types, processing conditions and brewing and to identify mitigation opportunities. The results showed that coffee in various aspects is different to most other affected food categories. During the roasting process the acrylamide levels are determined by formation and reduction mechanisms. Formation reactions are dominating in the beginning of the roasting process and lead to increasing levels at this stage. The reduction mechanisms begin to dominate already at very light roast degrees and result in decreasing levels of acrylamide during the following phases of roasting. This results in final levels in the finished products which are only a fraction of the observed maximum interim levels. Although differences between Arabica and Robusta in acrylamide formation potential have been found and the effects of varying the roast degree and roast time have been identified the conclusion is that only very limited options are available to reduce the acrylamide level in existing products. The same parameters also have very distinct effects on the sensorial characteristics and therefore potential adjustments to reduce the acrylamide levels would have a significant impact on the quality and the consumer acceptability of the final product. Furthermore, it was shown that acrylamide in packed roast coffee products is not stable. The acrylamide levels are decreasing significantly during the shelf life period when products are stored at ambient or higher temperatures. This should be taken into account when comparing monitoring data of market samples. Further investigations are necessary in order to understand the mechanism behind.