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An online NP-HPLC-DPPH method for the determination of the antioxidant activity of condensed polyphenols from different chocolate manufacturing stages

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Monomer cocoa polyphenols can be measured easily by RP-HPLC whereby more and more studies use NP-HPLC for evaluating the distribution of the oligomeric polyphenols. From conventional photometrical cuvette measurements it is known that the portion of condensed polyphenols in cocoa is much higher than that of monomer polyphenols. Due to the lack of reliable methods, it is difficult to predict the antioxidant capacity of single higher molecular polyphenols quickly. As presented recently, the antioxidant activity of condensed cocoa polyphenols can be measured simultaneously using an online NP-HPLC-DPPH assay. The question arises how condensed polyphenols are altered during different chocolate manufacturing stages and with them their antioxidant capacity. The online NP-HPLC-DPPH assay was applied to separate the homologous series of condensed polyphenols and simultaneously assess their antioxidant capacity in relation to their degree of polymerisation (DP) during a chocolate manufacturing on a lab process. This study shows that an unroasted cocoa extract contains condensed polyphenols with a DP of up to 13 monomer (-)-epicatechin units. It could be shown that changes in the profile of condensed polyphenol resulting from the chocolate process have an impact on their antioxidant capacity. From unroasted cocoa beans to the ready-to-eat chocolate, the maximum DP changes from 13 monomer units to 11 monomer units. The most prominent shift was observed during the drying process. In addition, it is clarified that during a four hours conching of cocoa mass the amount of condensed polyphenols changes just slightly and therefore also only marginally their antioxidant capacity. It could be shown that unroasted cocoa extract contains the highest amount of extractable condensed polyphenols and displays the most powerful antioxidant capacity.

Biography

Vasilisa Pedan studied Food Chemistry at the Technical University of Berlin in Germany and is currently doing her PhD at the Zurich University of Applied Sciences in Switzerland since 09/2012. Her field of research is the determination of changes of the polyphenol content during the chocolate manufacturing process.

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