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Anti-nutrient content in Ethiopian pulses: Effect of soaking, germination and cooking

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Chickpea and haricot bean are pulse foods which constitute an essential part of human diet. However, their nutritional importance is affected by the presence of anti-nutritional factors such as phytate. Limited information is available on its content in pulses following food processing. We investigated changes in nutrient and anti-nutrient content due to combination of thermal and non-thermal food processing; the non-thermal food processing included soaking and germination. Chickpea and bean varieties were obtained from Debreziet and Hawassa research centers, Ethiopia respectively. Hydration capacity of bean varieties ranged from 69.7%±4.1 to 103.8%±0.3 while the hydration capacity of chickpea varieties ranged from 81.5%±0.5 to 97.7%±2.5. There was significant difference in cooking time (19-65 minutes) of chickpea varieties; the lowest cooking time was noted for Habru. Among bean varieties, the cooking time of Red Wolayita was significantly different from Nasir and Hawassa Dume; it took more than twice to cook (p value<0.01). The phytate content of Habru-based products was reduced by 16-52% during soaking and germination treatments. In case of Hawassa Dume-based products, the phytate content was reduced by 8-35% during soaking and germination treatments with the highest percentage of phytate reduction obtained in 48 and 72 hour germination. Soaking and germination are effective household strategies to reduce the levels of phytate in pulse-based foods. Determining food processing strategies that will reduce anti-nutrients thereby maximizing the utilization of minerals from pulse-based diets is an important step to designing food based interventions.

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Added value of authentic food: Rapid quality and authenticity testing by fully-automated ^{1}H-NMR

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Fully-automated high resolution 1H-NMR (400 MHz) has found its way into the quality control of food and beverages over the last years. Its advantage is absolute reproducibility and transferability (user-, instrument- and laboratory-independent), which is not equaled by other methods currently used in food analysis. NMR reproducibility allows statistical investigations e.g. for detection of variety, geographical origin and adulterations, where smallest changes of many ingredients at the same time must be recorded. Sample preparation, measurement and processing are based on strict standard operation procedures which are substantial for this fully automated solution. The non-targeted approach to the data allows detecting even unknown deviations, if they are visible in the 1H-NMR spectra of e.g. fruit juice, wine, edible oils or honey. The same data acquired in high throughput mode are also subjected to quantification of multiple compounds. The fully automated 1H-NMR methodology will shortly be introduced and then results on fruit juices, wine and edible oils will be presented and the advantages of the fully automated 1H-NMR solutions shown. The method has been proven on fruit juices and wine, where so far unknown frauds could be detected. In addition conventional targeted parameters are obtained in the same analysis. This technology has additionally the advantage that NMR is completely quantitative and concentration calibration only has to be done once for all compounds.

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