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Degradation and leaching relevance for folate losses in green beans during processing

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Folates (vitamin B9) are described to be sensitive to different physical parameters such as heat, oxygen, light, pH and leaching. However most studies on folates degradation during processing or cooking treatments were carried out on model solutions or vegetables only with thermal treatments. Our aim was to identify which steps were involved in folates loss in industrial processing chains, and which mechanisms were underlying these losses.

For this, we first monitored the folates contents along an industrial canning chain of green beans. A second series of experiments studied folate diffusivity and degradation in green beans.

During industrial processing, folates contents decreased significantly by 30% in green beans canning process after sterilisation, with 20% of the initial amount being transferred into the covering liquid. Folate diffusivity constant, calculated according to Fick's second law, was 5.8×10^{-10} m²/s for green beans, which is the same order of magnitude as for sugars and acids in the vegetable considered. Folate thermal degradation kinetics was not monotonous in green beans especially at low temperatures (45 °C) and did not follow a first order reaction. The proportion of vitamers changed markedly after thermal treatment, with a better retention of formyl derivatives. Presence of oxygen was a major factor in folates degradation, with pseudo-first order degradation being observed for 5-methyltetrahydrofolate in presence of oxygen while other derivatives were more stable.

Limiting the contact between vegetables and both water and oxygen seems to be an important measure to limit folates losses during processing.

For oral presentation

For poster presentation (please tick one)