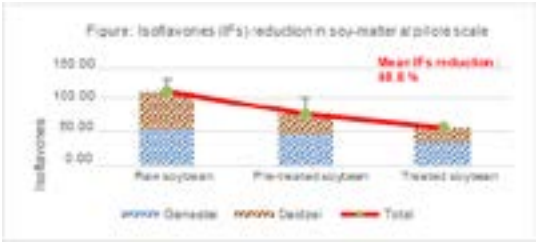
Souad Bensaada et al., J Food Nutr Disor 2021, Volume 10

An improved food process reducing Isoflavones in soy-based foodstuffs to decrease their impact on health

Souad Bensaada[1], Gabriele Peruzzi[2], François Chabrier[3], Pascal Ginisty[4], Carine Ferrand[5], Marc Vallat[6] and **Catherine Bennetau-Pelissero[1]**
[1]Université de Bordeaux, ARNA U1212 Inserm, France
[2]Biopress, France
[3]Agrotec, France
[4]IFTS, France
[5]Université de Bordeaux, BFP UMR 1332, France
[6]Université de Bordeaux, I2M UMR 5295, France

Statement of the Problem: Isoflavones are natural active compounds occurring in soy and other legumes as part of their anti-predators' arsenal. They have shown estrogenic, anti-estrogenic, anti-androgenic and thyroid effects. An intake over 40 mg/day induces an impairment of menstrual cycles in women, proliferating effects on women's breast cancer, goiters in children fed soy infant formulas and a reduction of men's sperm quality. Therefore, according to current knowledge, the risk/benefit balance of their consumption tilts towards a reduced exposure. Meanwhile, the daily consumption of isoflavones is increasing in Western countries, either directly through the consumption of soy- based foodstuff or indirectly through soy proteins hidden in processed dished. The purpose of this study is thus to achieve non-worrying isoflavones levels in soy-matter according to the reprotoxic LOAEL1 for genistein which was published in 2008 by the US-NTP2. Based on previous measurements, new steps were included by soy-food manufacturers which can remove up to 90% of the isoflavones of soy proteins-based dishes. Such treatments lead to adequate isoflavone intake for adults but not for children. To reduce isoflavones further, some food-processing steps mimicking those found in traditional Asian recipes were added to the production process of soy-proteins. Methodology & results: New food-processing steps were performed at both laboratory and pilot scales, on soy proteins. Isoflavone assays were performed using ELISA techniques. The optimization of the parameters resulted in an additional isoflavone removal over 40% which gives an adequate intake for the whole population. Conclusion & Significance: This study showed that it is possible to significantly reduce isoflavones in soy-proteins without impacting their main **properties**: size, water, lipid or protein content. This, provides a safer raw material for the food industry using soy proteins. Pre-industrial scale-up should confirm the accuracy of the selected parameters.



Recent Publications

1. Fernandez-Lopez, A., Lamothe, V., Delample, M., Denayrolles, M. & Bennetau-Pelissero, C. (2016). Removing isoflavones from modern soyfood: Why and how? Food Chem, 210, 286–294.
2. Bennetau-Pelissero, C. (2017). Positive or negative effects of isoflavones: Toward the end of a controversy: Response to the letter from Dr Messina and Dr Badger following the publication of the paper by Fernandez- Lopez A, Lamothe V, Delample M, Denayrolles M and Bennetau-Pelissero C. Food Chem, 225, 293–301. doi: 10.1016/j.foodchem.2017.01.033.
3. Lee, A., Beaubernard, L., Lamothe, V., & Bennetau-Pelissero, C. (2019). New Evaluation of Isoflavone Exposure in the French Population. Nutrients, 11(10), 2308. https://doi.org/10.3390/nu11102308
4. Bennetau-Pelissero C. (2019) Plant Proteins from Legumes. In: Mérillon JM., Ramawat K. (eds) Bioactive Molecules in Food. Reference Series in Phytochemistry. Springer, Cham. https://doi.org/10.1007/978-3-319- 78030-6_3
5. Touillaud M, Gelot A, Mesrine S, Bennetau-Pelissero C, Clavel-Chapelon F, Arveux P, Bonnet F, Gunter M, Boutron-Ruault MC, Fournier A. (2019). Use of dietary supplements containing soy isoflavones and breast cancer risk among women aged >50 y: a prospective study. Am J Clin Nutr;109(3):597-605. doi: 10.1093/ajcn/nqy313.

Biography

Souad Bensaada is passionate about health and maintaining it. Pharmacist, she studied plants with health values at Bordeaux University where she is currently doing her PhD on endocrine disrupting effects of soy isoflavones. Her understanding of the subject is not only based on academic knowledge but also on a long experience in the pharmaceutical industry where she learned the industrial constraints and the quality approach. This double competence allows her to bring powerful insight in the research team.