

Investigation of critical process parameters to reduce the hydrocyanic acid in flaxseed presscake

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In times where “superfoods” and demands for more sustainability are becoming more vital, flaxseeds have gained a lot of attention over the last few years. This increased interest is based on the wide range of applications flax can be used for. Containing valuable nutrients such as, proteins, linolenic acid, dietary fibers, minerals, vitamins and antioxidants, flax as a raw material is mostly used in shredded form, as seeds or as an oil. Despite its beneficial nutrients, flax also contains antinutrients, such as cadmium and hydrogen cyanide most prominently, which have an adverse effect on the human health. The cold pressing of flaxseeds into oil accumulates hydrogen cyanide in the produced presscakes. As of today, these presscakes are not getting used to their full potential and the value chain bears a lot of room for improvements. The objective of the present work was to develop a procedure to reduce the hydrogen cyanide in flaxseed presscake below a critical level of 150 mg/kg.

After processing to oil, the average hydrocyanic acid content accumulating in the presscake even exceeded the limit value for animal feed of 350 mg/kg in individual cases, resulting in a restriction on its use as in food incorporations. Several pre-treatment methods to reduce the hydrocyanic acid concentration in flaxseed presscake were tested and evaluated since the quality-forming parameters such as protein content (Ø 28.7%), dietary fiber content (Ø 31.0%). Foaming, emulsification and water binding capacities tests revealed the use of this by-product in food applications, such as milk or egg alternative, after treatment. A combination of steaming at 100°C and drying at high temperature for a short time led to a significant reduction below 150 mg/kg of hydrocyanic acid. This allows safe use of the presscake in food matrices. The process was validated on a large pilot scale demonstrating the scaleability of the technology.