SciCom

Scientific Committee of the FASFC

Advice 12-2018 of the Scientific Committee of the FASFC on pasteurization of colostrum with supercritical CO_2

Background & Terms of reference

Colostrum is marketed as feed for calves as it contains important components for the new-born calf, in particular a high level of immunoglobulins. Because the thermal pasteurisation conditions imposed by EU legislation inactivate the immunoglobulins present in the colostrum, an alternative method with supercritical CO_2 ($scCO_2$) is proposed to ensure the microbial safety of colostrum, while keeping the immunoglobins as good as intact.
The Scientific Committee has been asked to assess whether this alternative treatment results in an equivalent pasteurisation compared to the pasteurisation treatment imposed by legislation of colostrum intended for animal consumption (Regulation (EU) No 142/2011) as well as intended for human consumption (Regulation (EC) No 853/2004).

Because the initial technical dossier and the additional information provided at the request of the Committee to supplement the technical dossier proved to be insufficient to assess the equivalence of the $scCO_2$ treatment with thermal pasteurization of colostrum from an animal health and food safety point of view, the operator proposes a strategy of planned experiments. The Scientific Committee has also been asked to evaluate this presented experimental validation strategy.

Methodology

The opinion concerns a scientific evaluation on the basis of expert opinion of the technical dossier supplied by the operator.

Discussion of the technical dossier

In the opinion a non-exhaustive overview of elements that are necessary to evaluate the equivalence of the $scCO_2$ process with pasteurisation and that are missing from the technical dossier and the validation plan, is given. These elements relate to:

- a scientific framework with reference to literature for, among other things, the selected process conditions, the advantages and disadvantages of the proposed $scCO_2$ process;
- a more detailed description of experimental conditions, with experimental process conditions being the same as those that will be applied on a commercial scale; and
- the choice of indicator organisms and of validation criteria.

Although these elements were partly clarified by means of the additional information provided by the operator to the Committee, the information presented and the information expected based on the validation plan are still insufficient to assess the equivalence with thermal pasteurisation from an animal health and food safety point of view.
In general it can be stated that a sufficient number of experiments must be performed to allow a statistical evaluation of results. Given that the efficiency of the process depends on the matrix composition (e.g. effect of fat content), these experiments should be carried out with well-characterized colostrum. The impact of the final $scCO_2$ process parameters with the

impact of pasteurisation on the inactivation of pathogenic, vegetative micro-organisms should be compared. Because in addition to temperature and time, pressure and matrix / CO_2 ratio also play a role, the heat resistance of these organisms is not necessarily correlated with their $scCO_2$ resistance. It is therefore recommended to test a larger set of micro-organisms than only the most heat-resistant micro-organisms.

Finally, it should be noted that the present $scCO_2$ process does not lead to a negative alkaline phosphatase reaction. The dossier does not propose an alternative indicator for this time-temperature indicator included in the legislation for controlling the effectiveness of the applied pasteurisation conditions on the final product.

Conclusions

The $scCO_2$ treatment of certain foods and of colostrum in particular, appears to be a promising technique. However, the information provided to the Committee is insufficient to evaluate from an animal health and food safety point of view the equivalence of the proposed $scCO_2$ process with thermal pasteurisation of colostrum.
In general, the effect of pasteurisation and the effect of the $scCO_2$ process on a number of relevant bacterial and viral parameters should be compared. These experiments should be performed on a sufficient number of samples of colostrum to allow a statistical interpretation of the results.
Finally, the Committee notes that in the dossier no indicator, similar to the alkaline phosphatase test for pasteurisation imposed by legislation, is proposed to control the effectiveness of the $scCO_2$ process on the end product.

The full text is available on this website in dutch and in french.