Influence of factors involved in chicken fat dry-fractionation

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Dry fractionation of fats and oils involves selective crystallization of the most saturated triglycerides through cooling of the melted fat, followed by filtration. This process is the most inexpensive and requires no chemical additives.
It is difficult, however, to quickly evaluate the conditions required to obtain the desired fraction quality due to the many factors influencing crystallization. Fat crystals that are easy to separate from the solution can be obtained through suitable monitoring of the process.
In this study, chicken fat was dry fractionated on a pilot scale according to different cooling conditions.
Process factors (end temperature, cooling rate and residence time) were studied and their effects on fat fraction quality were discussed with the aim of optimizing the process conditions. Crystal formation and growth during crystallization were monitored.
The results showed that the thermal pathway during cooling had a marked impact on separation efficiency and that a temperature plateau was necessary during the nucleation step for the formation of crystals with good filtration properties.
This study highlighted the effects of key factors involved in the dry fractionation process and enabled us to determine the operating conditions to obtain a targeted stearin quality. This approach could be used for dry fractionation of other fats and oils.