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Considerations for developing a generalized input – output model for dry fractionation of pork lard

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Abstract

Dry fractionation is a "clean" separation operation of lipid fractions liquid / solid from an initial mixture. The paper proposes that synthesizing all influence factors on the operation, to design a generalized input - output model, useful in optimizing the operation of dry fractionation applied to pork lard.

Keywords: dry fractionation, pork lard, input – output model

1. Introduction

Dry fractionation is a thermo - mechanical operation involving selective crystallization under controlled conditions and mechanical separation by centrifugation or filtration, in different phases, liquid and solid, of the initial mixture of fats. It is a "clean" operation ("natural" or "green") because it represents a physical process which doesn't have changes in triglyceride levels compared to other chemical fractionation processes as hydrogenation or interesterification [1].

To elaborate a generalized input - output model for a given operation, must be identified three groups of variables [2]:

I. Group of input variables, which are that initial variables due to which the whole operation / entire process can be controlled and ordered;

II. Group of output variables representing the state resulting from the variation of the initial parameters (input variables);

III. Group of control variables whose variation controls and order both the input and output variables.

2. The input - output model

To develop a generalized input - output model for the dry fractioning operation of pork lard, the outgoing point is block diagram shown in figure 1.

Dry fractionation of pig lard as raw material, subject before to homogenization and melting at a temperature of 28°C, occurs due to centrifugation and separation. So, it can identify groups of variables on which we made the generalized input - output model shown in figure 2, as follow:

I. Group of input variables, split into two subgroups:

1. *Characteristics of the raw material – pork lard* (viscosity, initial temperature);

2. *Parameters of the homogenization operation* (rotation speed of the homogenizator, temperature, homogenization time);

3. *Parameters of the heating operation* (time, temperature).

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II. Group of output variables, represented by fractions, liquid and solid, which are obtained.

III. Group of control variables, represented by the centrifugation – separation (fractionation) (time, temperature, rotation speed).

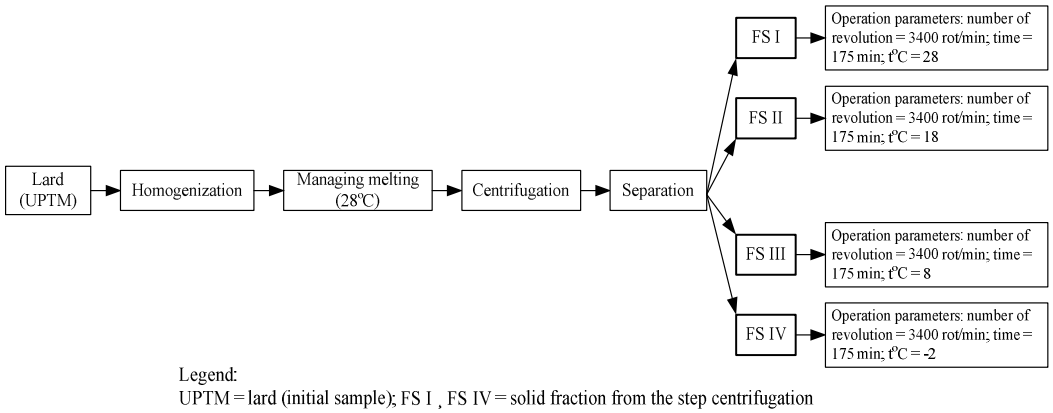

Figure 1. Block scheme for the dry fractioning operation of pork lard resulting in solid lipid fractions [3]

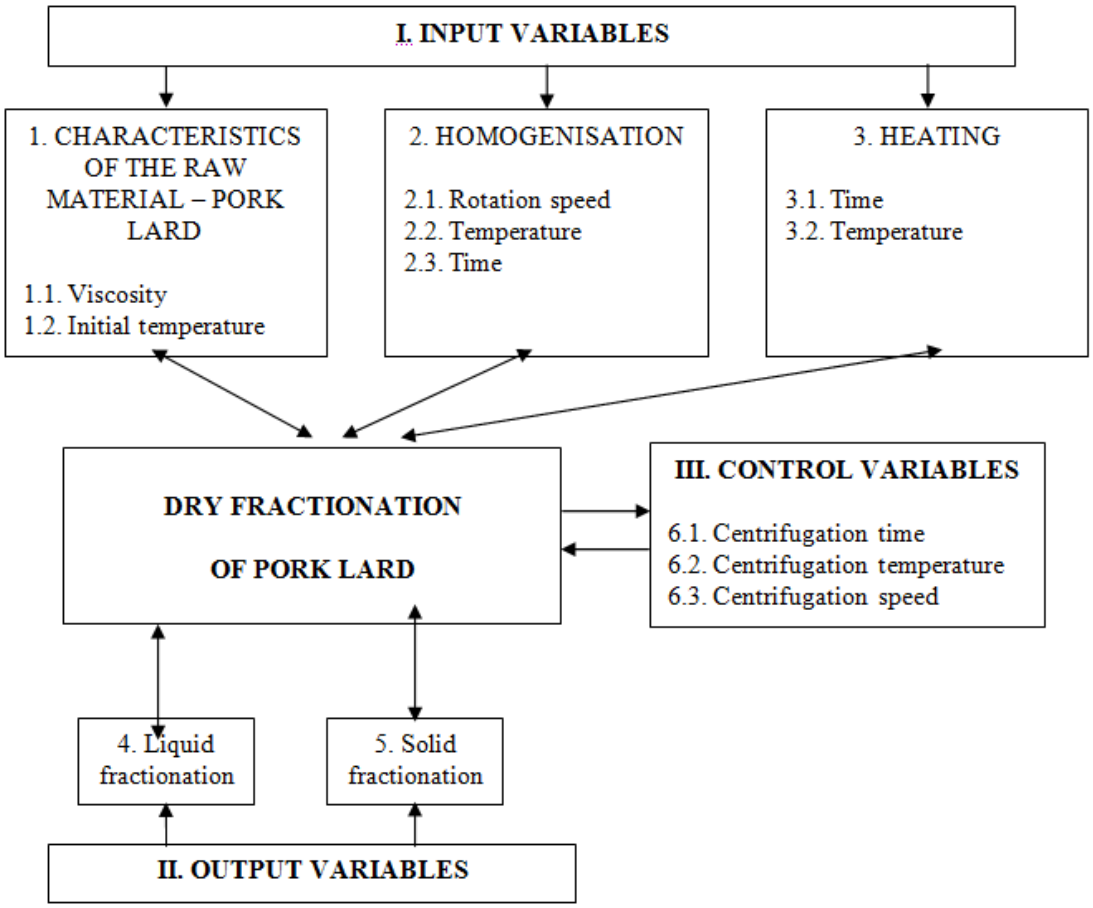

Figure 2. Structure of the generalized input – output model for dry fractionation of pork lard

4. Conclusion

This analysis from the developed generalized input – output model can be seen that the whole dry fractionation operation of pork lard can be controlled and ordered through the variation of the three categories of variables: input, output, control. Achieving this generalized model allows mathematical modeling of fractionation and thus optimizing the operation.

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