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Mathieu Person, Didier Miséréré, Géraud Vors, Agnès Duri-Bechemilh, Bernard Cuq, Pierre Schuck, Romain Jeantet, Cécile Le Floch-Fouéré

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## Statistical analysis to characterize the raw materials of an industrial agglomeration process.

M. PERSON <sup>(1,2,3)</sup>, D. MISÉRÉRE <sup>(3)</sup>, G. VORS <sup>(3)</sup>, A. DURI <sup>(2)</sup>, B. CUQ <sup>(2)</sup>, P. SCHUCK <sup>(1)</sup>, R. JEANTET <sup>(1)</sup>, C. LE FLOCH-FOUÉRE <sup>(1)</sup>

*1 STLO, UMR1253, INRA, AGROCAMPUS OUEST, 35000, RENNES, France*

*2 IATE, UMR1208, INRA, SUPAGRO MONTPELLIER, UNIVERSITÉ MONTPELLIER 2, CIRAD, 34060 MONTPELLIER, France*

*3 RÉGILAIT, 71118 SAINT-MARTIN-BELLE-ROCHE, France*

[mathieu.person@rennes.inra.fr](mailto:mathieu.person@rennes.inra.fr)

To produce instant agglomerated milk powder, industrial producers receives milk powders from several different suppliers. However, despite the implementation of a strict requirement specification to reach a constant quality of final product, differences can be observed depending on the origin of raw material and the processing parameters.

In this work, the quality control result from 8 different skim milk powder sources used over one year of production (275 batches) were collected to observe data on composition (proteins and fat content), humidity (water content and activity), density criteria (aerial and bulk), pH and ageing. These data were statistically analyzed using a principal component analysis (PCA).

Almost 65% of the total variability was represented by the projection of the experimental set up on the map defined by the first two principle components (PC) of the PCA. A hierarchical cluster analysis performed on the PCA data made it possible to distinguish 3 different classes of raw material depending on their physicochemical characteristics: – Class one corresponding to the major part of the raw materials. – Class two corresponding to one specific differentiated from the others by higher density characteristics and less proteins. – Class three corresponding to one other highly differentiated from the others on all criteria (humidity, composition, density, ageing).

Thus, statistical analysis of the production data made it possible to obtain a global characterization of the different skim milk powders, and to distinguish two of them although close to the others when considering their characteristics one by one.