

Matthias Lütke Entrup

Advanced Planning in Fresh Food Industries

Integrating Shelf Life
into Production Planning

With 63 Figures and 31 Tables

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Foreword

During the last three decades trade, industry and also academia became heavily involved in the development primarily intended towards more effective planning and control of logistical operations in supply chains. Lately, these approaches began to be directed towards fresh food supply chains. Competitive fresh food supply chains require that the aspects costs, quality, food safety and technology be taken into account simultaneously in a multidisciplinary way. In recent years the issue of food safety got large emphasis in government, industry and society (consumers). The introduction of the General Food Law by the EU from January 2005 on even put more emphasis on the issue of food safety.

It turns out that Advanced Planning and Scheduling Systems (APS) can play an important and integrative role in supporting decision making activities in fresh food supply chains by considering shelf life as an instrument to generate more added value and food safety. Basically the work of Matthias Lütke Entrup is concentrated on two research questions:

- Which requirements must APS systems cover in order to efficiently and effectively support production planning in fresh food industries?
- How can shelf life be integrated into production planning? How can production planning contribute to optimizing shelf life output?

In his study the author shows how these questions should be answered adequately. His results and conclusions are of paramount importance for integrating the issue of shelf life into production planning.

The study provides a wealth of insights and results which are significant both from a practical as well as from an academic point of view. The research starts with an overview of current APS systems and highlights the need of a new generation of planning software which aims at supporting decision making in supply chain management. Although APS gain increasing acceptance in industry, a number of issues remain, in particular at the detailed planning and scheduling level, which are not satisfactorily covered by the decision models to be found in the standard APS software packages. This is truly the case for the fresh food industries. Undoubtedly, the most important planning issue regarding fresh food lies in the consideration of shelf-life. So far, vendors of APS systems have taken many efforts to consider shelf-life issues in their planning systems, however, without covering all of the characteristics being important in Fresh Food Supply Chains (FFSCs) and fresh food production systems. One of the main contributions of the study by Matthias Lütke Entrup is a comprehensive analysis of the planning requirements of fresh food industries on one hand and the decision support offered

by typical APS systems on the other. Software packages from leading players in the market are assessed looking at the scope of shelf life integration and its capabilities to generate plans that optimize shelf life output.

Based on the shortcomings of current APS systems, new quantitative planning models are developed and resolved. These models consider shelf life planning problems in specific fresh food industries (yogurt production, sausage production and poultry processing). The models are based on the general block planning principle and are adapted to the needs of the specific fresh food planning applications. Considerable care has been taken to obtain compact model formulations which can be solved very efficiently by use of standard optimization software. Numerical experiments demonstrate the applicability of the planning models in realistic industrial settings.

As a result, the author makes clear that suppliers of APS software are currently unable to offer APS systems in which the integration of shelf life into production planning has been dealt with adequately. Specifically, product freshness has been modeled by the author as part of the optimization and not as a constraint within the planning function. This is indeed a new and creative contribution of Matthias Lütke Entrup to solving complex planning problems of considerable practical relevance. The applications (case studies) have been selected carefully by the author in such a way that many other application fields in fresh food industries could benefit from his results.

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Prof. Dr. Hans-Otto Günther

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