

The Golden Spirit – an analytical-based approach to improve sensory quality of spirits

Sonia Petignat-Keller¹, Martin Heiri¹, André Marti², Sharona Perrin², Jonas Inderbitzin¹

¹ Agroscope CH-8820 Wädenswil, ² METAS CH-3003 Bern-Wabern

Introduction

DistiSuisse is an association **promoting the quality of Swiss spirits**. Their national **product award** is the largest in Switzerland, taking place every two years. It helps to preserve a Swiss cultural heritage and to promote its status in our society. The aim of the study was to gain understanding of **analytical parameters and their effects on sensory quality**, as rated by expert judges. Based on the last three events, 1424 spirits out of 19 categories were analyzed. **Decision tree models** to predict expert ratings are proposed for specific product categories. Observed cutoff points for analytical parameters and sensory quality are shown by using **apple distillates as an illustration**, since this was one of the least good judged category beside apricot and williams (Fig.1).

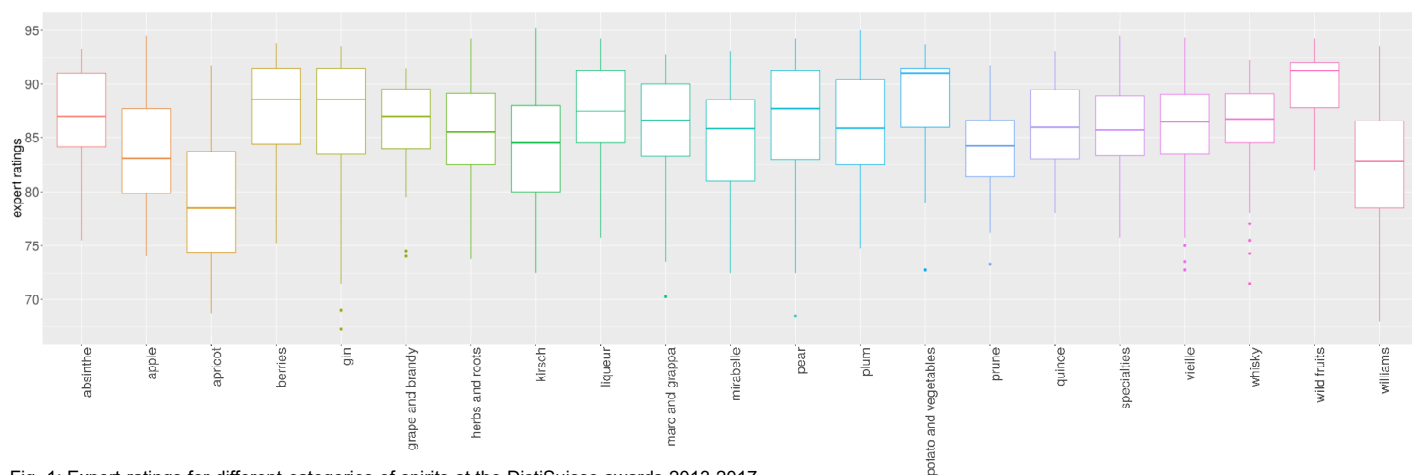


Fig. 1: Expert ratings for different categories of spirits at the DistiSuisse awards 2013-2017.

Methods

GC-FID, GC-MS and HPLC for analysis and individual ratings by expert judges according to a 100-point system for appearance, odor quality, odor intensity, taste quality, taste intensity, mouthfeel and harmony/complexity were used. Instrumental data included alcoholic strength by volume, extract, methanol, higher alcohols (fusel oils), ethyl- carbamate, sugar, thujone and several volatiles. Instrumental analysis of all submitted products were carried out under **accredited conditions** (ISO 17025).

Results

Out of 38 parameters three showed to influence the judgement of apple spirits significantly. Ethyl acetate ≥ 395.5 mg/LrA (main head compound) and 2-butanol < 46 mg/LrA (tail compound) had a negative effect, while **diethylsuccinate** > 6 mg/LrA appeared to have a positive effect on the overall assessment, possibly due to increased fruitiness and typicity (Fig.2).

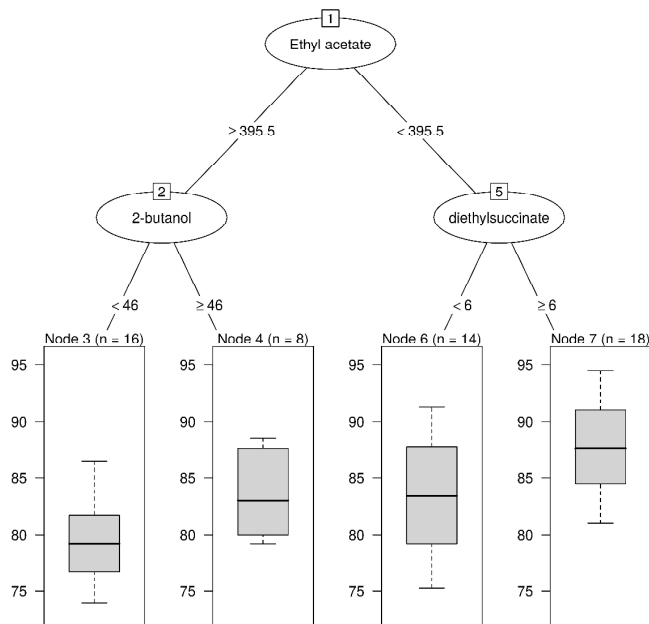


Fig. 2: Decision tree for the expert ratings of apple spirits.

Conclusion

The detailed study and comprehensive data collection over six years provide an overview on the **diversity** of Swiss spirits. Our mission is to **support distillers** in the development and promotion of outstanding products through **knowledge transfer**. Decision tree models for predicting expert evaluations **help to improve the quality** of certain product categories and thus increase product acceptance.