

Quality Discrimination of EVOOs

Insights from the long-term project: *International Olive Oil Award – Zurich*

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Background

For sensory evaluation of Extra Virgin Olive Oils (EVOOs) within the annual “International Olive Oil Award – Zurich” (a long-term project organized by the Sensory Science Group of ZHAW) the Swiss Olive Oil Panel (SOP) uses a profile sheet based on an extended methodology, which is cross-validated between the Swiss (SOP) and the German (DOP) Olive Oil Panels. Using this methodology and thereby exceeding a regular Panel Test (EC 640/2008) and the verification of the category “extra virgin”, additional descriptors are used to realize a quality-discrimination within the category of EVOOs. In particular the attribute “harmony” is responsible for this improvement of the methodological approach. Using “harmony” as a quality-factor, the discrimination between “low” up to “premium” quality levels within the category of EVOOs is possible [1].

Quality Level	Description / Meaning
Not acceptable 0.0 → 2.4	these oils show panel results with various single defects, but no significant median for a defect / there might be partly unknown defects, perhaps totally inharmonious aspects like for example a certain gallic bitterness / on a whole these oils are more virgin than extra virgin
Very Low 2.5 → 3.4	these oils show many inharmonious aspects / they offer many negative aroma aspects
Low 3.5 → 4.4	these oils show partially inharmonious aspects / they offer only few aroma aspects and as well single negative ones
Average 4.5 → 5.4	these oils show no negative aspects at all, but also nothing "exciting" concerning the presence of aroma components / these oils are often overripe and not always perfectly blended
High 5.5 → 6.4	these oils show various aspects of flavour / they offer an already more complex aroma profile that can be traced back to the variety used or the excellence of the blend
Very High 6.5 → 7.4	these oils show a complex aroma profile / they offer a pronounced harmony and persistency as well a good flavour
Excellent 7.5 → 10.0	these oils show a very complex aroma profile / they offer a very pronounced harmony and persistency and therefore an excellent (premium) flavour

Table 1: Quality description within the range of EVOOs [1]

Practical Approach / Research Questions

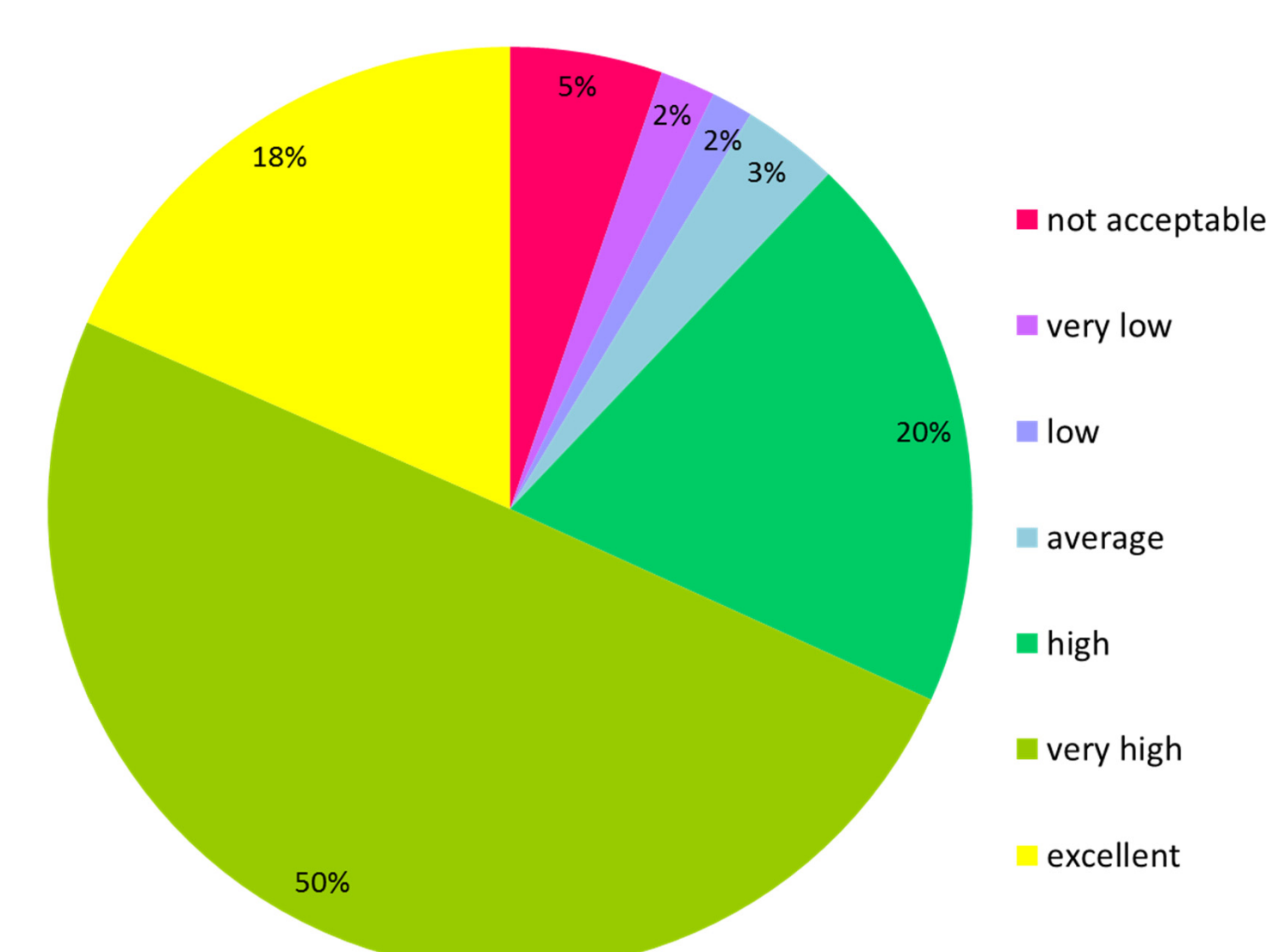


Figure 1: Quality Levels 2009-2013 (%) (n = 620)

Statistically analyzing project data (n = 620, including defective, not acceptable and oils with very low quality) of the last five years (2009 up to 2013) [Figure 1], allows answering selected research questions and explaining relations between selected quality criteria of n = 570 as “extra virgin” confirmed oils.

Altogether 88% of these oils were above “average” and showed “high” (20%), “very high” (50%) and “excellent” quality (18%).

Findings

A highly significant correlation ($p < 0.0001$) exists between harmony values and the intensity of bitterness ($R^2 = 0.172$) [Figure 2]. Until a certain level of bitterness (3 on a 10 cm intensity scale) harmony values augment. Beyond that point an opposite effect is observed. Almost the same picture can be found for the intensity of pungency ($R^2 = 0.304$) [Figure 3] and the intensity of fruitiness ($R^2 = 0.506$) [no Figure].

Findings (continued)

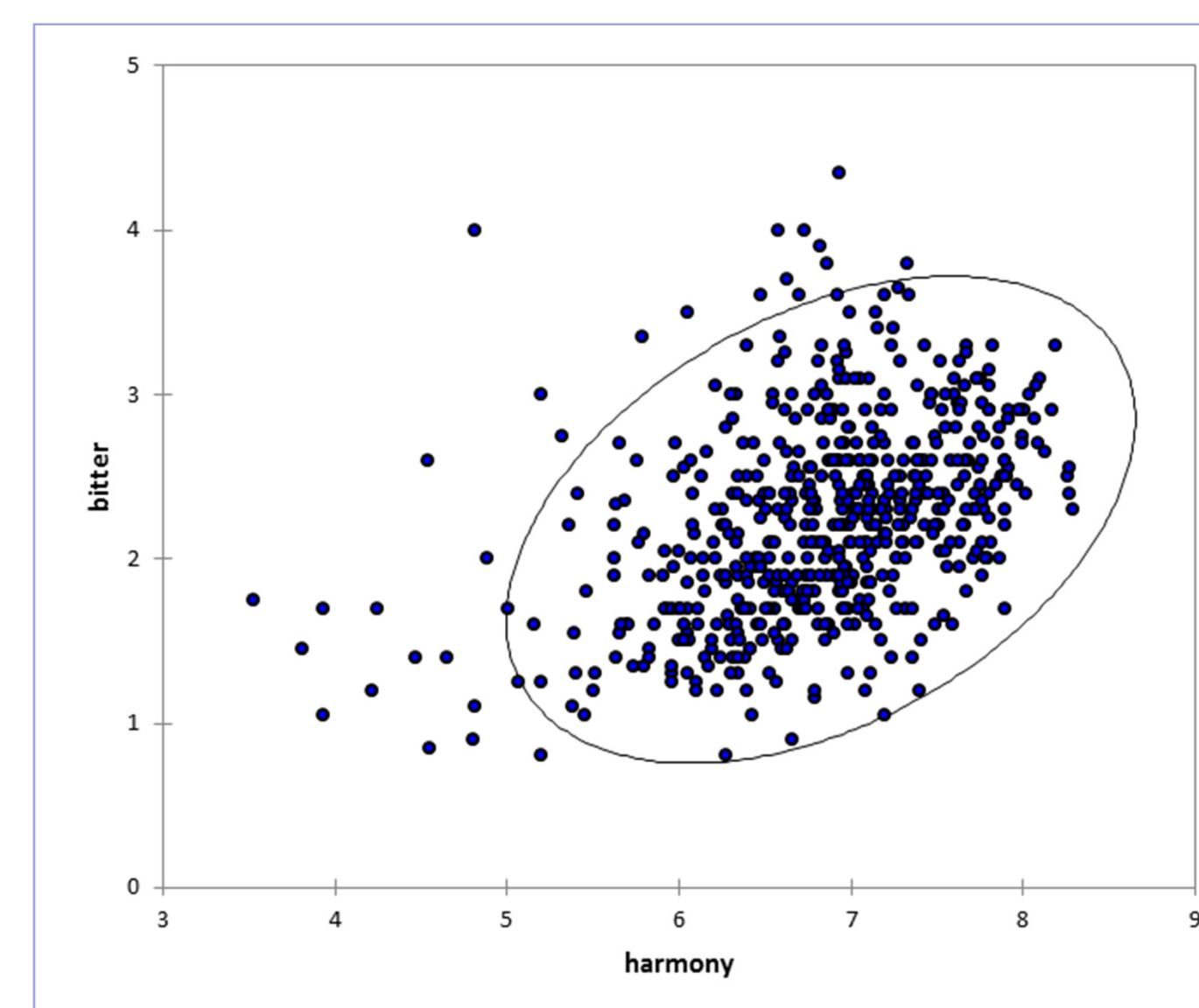


Figure 2: Harmony values and intensity of bitterness are significantly correlated ($R^2 = 0.172$, n = 570)

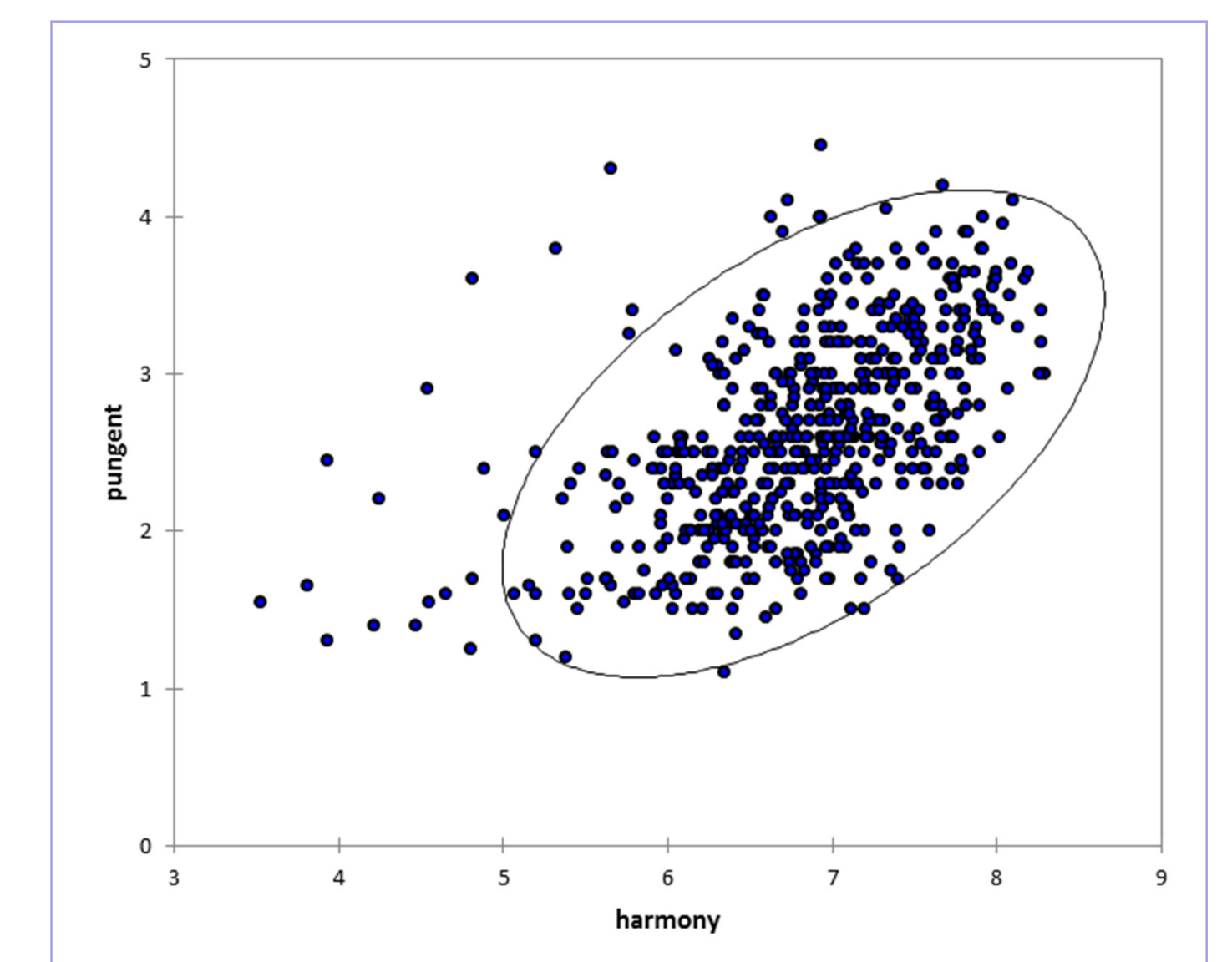


Figure 3: Harmony values and intensity of pungency are significantly correlated ($R^2 = 0.304$, n = 570)

Looking at the different quality levels of n = 570 EVOOs (“low” up to “excellent”), that were evaluated for their fruitiness and at the same time were characterized as “green” or “ripe” or “green and ripe”, there exist certain interdependences. As shown in Figure 4, the higher the quality level, the more as “green” characterized oils exist.

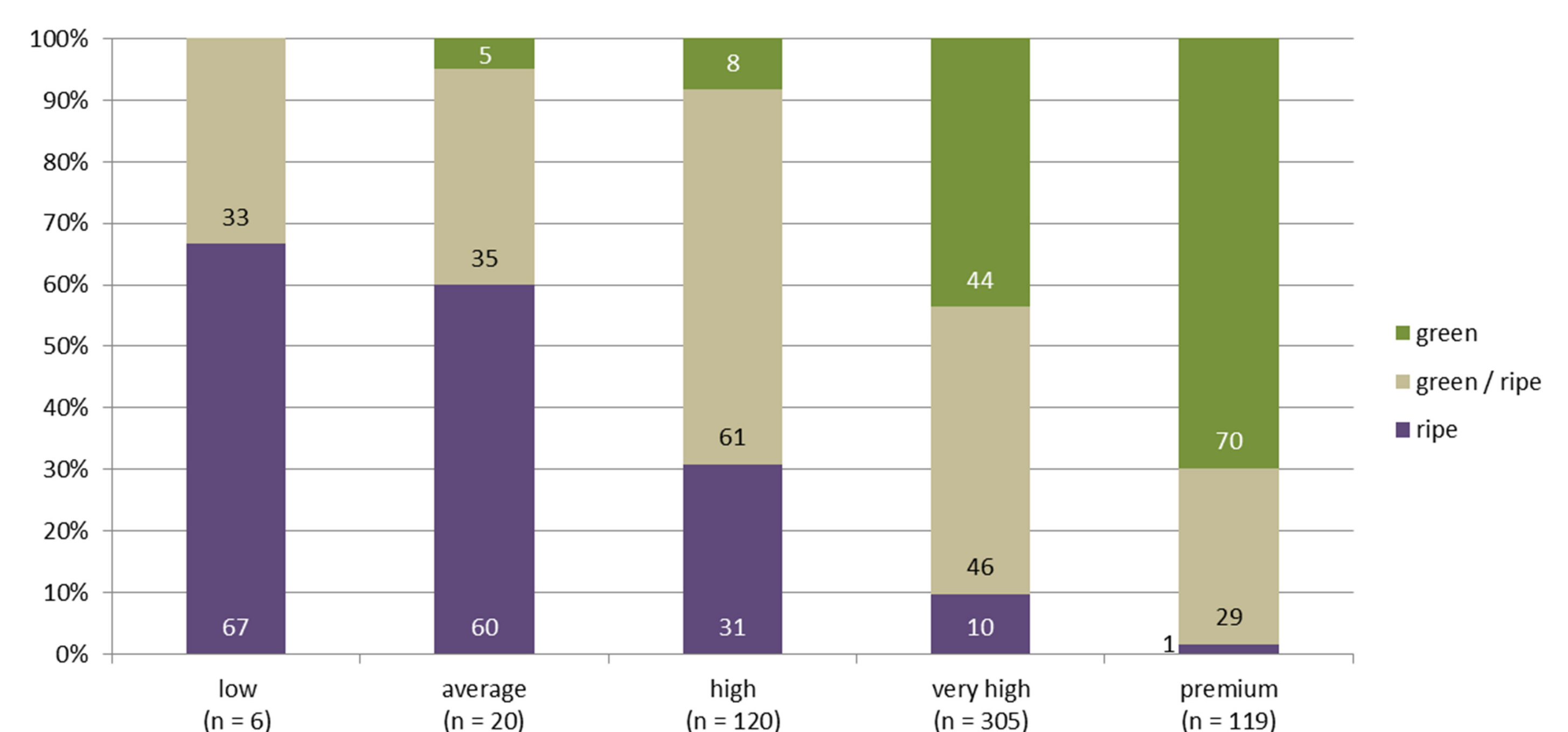


Figure 4: Contribution of «green», «ripe» and «green and ripe» described olive oils in the various quality levels (%) (n = 570)

Production Criteria		
Labeling	PDO/PGI	no label
n =	148	422
Organic production	organic	conventional
n =	104	466
Cold extraction / pressing	cold ex. / pr.	regular
n =	182	388
Mono-varieties	mono-varieties	blends
n =	282	288

Table 2: Overview of EVOOs with specific production criteria (n = 570)

Production criteria as there are labeling, organic, cold extraction / pressing and mono-varieties seem to have no impact on quality differentiation within the grade of EVOOs [Table 2].

In no case significant differences regarding harmony could be found within the production criteria.

Outlook

A better differentiation between olive oils within the grade of EVOO is possible by using insights concerning the relevance of quality criteria. Especially the “harmony” value is a good predictor of different quality levels within the range of EVOOs. Any helpful information towards consumers as well as a serious and objective “Sensory Marketing” of EVOOs should rely on these additional aspect.



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Literature:

[1] A. Bongartz, D. Oberg: Sensory Evaluation of Extra Virgin Olive Oil (EVOO) Extended to Include the Quality Factor „Harmony“; Journal of Agricultural Science and Technology A1 (2011), 422-435