when we mention ‘trait differences between individuals’ possibly contributing to differences and explaining some of our observations.

REFERENCE


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Is There a Relationship Between Alcohol Quality and Health?

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Abstract — A clear definition of ‘alcohol quality’ is currently not available and the use of the term varies considerably depending on the scientific field and the individual author. Intrinsic factors of ‘alcohol quality’ may be taste and flavour or the absence of certain toxic contaminants. Extrinsic factors may include price, brand image, labelling or perceived authenticity, which are typically unrelated to public health outcomes. This article shows that using the term ‘alcohol quality’ with varying definitions and underlying concepts may lead to misunderstandings, if not to clear misinformation (sometimes also intentionally by industry) when ‘lower quality’ is interpreted as ‘more toxic’ especially in the case of substitution of commercial beverages to unrecorded alcohol. We suggest the use of clearly defined terms instead, such as ‘taste quality’ or ‘brand price’, whenever possible.

In alcohol science, especially in the alcohol policy field, the term ‘alcohol quality’ is regularly used. For example, it is assumed that increase in alcohol price (e.g. due to taxation) may lead to substitution from ‘higher quality’ to ‘lower quality’ brands (Gruenewald et al., 2006). However, there is no clear definition of ‘alcohol quality’. We will argue that using the term with varying definitions and underlying concepts may lead to misunderstandings, if not to clear misinformation (sometimes also intentionally by industry) when ‘lower quality’ is interpreted as ‘more toxic’ especially in the case of substitution to unrecorded alcohol (Lachenmeier and Rehm, 2009).

If we search for the concept of ‘alcohol quality’ (with all variations such as wine/beer/spirit quality) in PubMed and Web of Science, it becomes quickly evident that the use of the term varies considerably depending on the scientific field and the individual author (Table 1). In the food science and technology field and also from a consumer’s perspective, the alcohol quality is mostly determined by intrinsic factors such as organoleptic quality (typical desirable taste and absence of off-flavours). To a lesser extent, the degree of craftmanship or the absence of certain artificial ingredients are associated with quality in this field (Adams, 2006). The problem is that such indicators are difficult to measure. The restricted literature that is available shows that in most cases consumers were unable to differentiate brands of beers (Allison and Uhl, 1964; Cox and Klinger, 1983; Segal and Stockwell, 2009), malt whisky from blended whisky (Chadwick and Dudley, 1983) or between different strengths of vodka and rum (Lachenmeier et al., 2011a) by taste and a study on US beer brands by professional tasters has shown that there was no correlation between price and taste-test quality either (Anon, 1996). Only panels of highly trained assessors (e.g. according to ISO 8586-1) may have the ability to discriminate products within one category of alcoholic beverages such as types of Scotch whisky or wine (Lee et al., 2001; Zamora and Guirao, 2004).

The observation that the price of alcoholic beverages is not related to intrinsic factors is in line with the economic and marketing literature. The extrinsic definition of ‘quality’ is most extreme in economic science, which sees ‘alcohol quality’ as not only positively correlated with but also sometimes exclusively dependent on price (Ordonez, 1998; Gruenewald et al., 2006). However, marketing research has shown that brand image may be more important in determining product perception than price (Allison and Uhl, 1964; Jacoby et al., 1971; Beverland, 2005; Charters and Pettigrew, 2007; Della Lucia et al., 2010; Szolnoki et al., 2011). The extrinsic ‘alcohol quality’ is therefore assumed to be multifactorial and dependent on indicators such as price, brand image, geographical origin, bottle type, label design, packaging information or perceived authenticity.

It must be stressed that none of the quality definitions mentioned so far is related at all with public health outcomes. The impact of the quality of alcohol on burden of disease [see details in Rehm et al. (2010a)] must therefore be interpreted in the strictest sense of toxicology, meaning that a threshold on the dose–response curve between an ingredient of alcoholic beverages and a public health relevant outcome (e.g. death, or poisoning) must be exceeded prior to the assumption of a health effect (Lachenmeier et al., 2011c). In the past, toxicological thresholds were exceeded only for few substances other than ethanol such as methanol or lead (Lachenmeier et al., 2007, 2012; Rehm et al., 2010a). It is clear that when ‘quality substitution’ occurs in the economical sense (i.e. if the consumer switches from a premium brand to a discount brand due to price increase), this is not directly associated to any health outcome. Although, it may be indirectly, if the switch means that more ethanol is consumed as a consequence. Additionally, less nutrients (such as polyphenols with antioxidant activity) may be contained in cheaper beverages, especially in white spirits (Chick et al., 2011). However, conclusive epidemiological evidence that nutrients in alcoholic beverages may protect against the effects of ethanol is lacking so far (Lachenmeier et al., 2009).

Contrary to what is commonly believed, the assumption of no direct health influence of economic ‘quality substitution’ also upholds if the consumer switches from a commercial alcoholic beverage to unrecorded alcohol (Rehm et al., 2010b; Lachenmeier et al., 2011b). The only exception may again be that the consumer gets higher strength alcohol for a lower price, which may lead to more detrimental health effects due to more ethanol being consumed (Rehm et al., 2010a).

This brings us to the last dimension of ‘alcohol quality’ from the behavioural perspective of the alcohol-dependent consumer or of drinkers who drink solely for the purpose of intoxication [e.g. adolescent heavy episodic (binge) drinkers]. For these consumers, quality may be related to the amount of pure alcohol per drink (Cole et al., 2008; Szmigin et al., 2008); or, in other words, it is inversely related to the unit price of pure alcohol (which is just the opposite of the economical quality mentioned above). For the dependent consumer, unrecorded alcohol may therefore be of higher quality than commercial alcohol.

Our overview shows that the term ‘alcohol quality’ is of such ambiguity that it should be defined whenever it is used. This is especially important in interdisciplinary journals, where no clear implicit definition can be assumed. We would however suggest using clearly defined terms instead, such as ‘taste/flavour quality’ or ‘brand price’, whenever possible.

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Alcohol Dehydrogenase Isoenzymes Nomenclature

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We read with a great pleasure the article ‘Rare ADH variant constellations are specific for alcohol dependence’ by Zuo et al. (2012). We want to direct the specialty about the alcohol dehydrogenase (ADH) isoenzyme nomenclature to the readers of Alcohol and Alcoholism. Namely, the authors use an old isoenzyme nomenclature what can cause some confusion to not enough familiar readers.

Electrophoresis is an analytical method used in molecular biology and medicine. It is applied for the separation and characterization of proteins, nucleic acids and enzymes.

Enzymes which catalyse the same reaction but which have different chemical or physico-chemical properties are known as isoenzymes. The nomenclature principles are the same for all the enzymes (alkaline phosphase (ALP), lactate dehydrogenase (LDH), creatinin kinase (CK), ADH etc.). The basic model is the model for LDH. It was the first one with defined nomenclature based on the speed of movement in electrophoresis.

The isoenzymes of LDH, all of which catalyse the same reaction—the reversible conversion of lactate into pyruvate exhibit distinct structural differences and hence migrate at different rates on electrophoresis (Bais and Panteghini 2006; Panteghini et al., 2006).

The LDH has a molecular weight of 134 000 and comprises four peptide chains of two types: M and H, each under separate genetic control. The subunit compositions of the five isoenzymes, in the order of decreasing anodal mobiliry in an alkaline medium, are LD-1 (HHHH; H4), LD-2 (HHHM; H3M), LD-3 (HHMM; H2M2), LD-4 (HMMM; HM3) and LD-5 (MMMM; M4) (Plagemann et al., 1960; Bais and Panteghini 2006; Panteghini et al., 2006).

It was designated that the most rapidly anode-migrating isoenzyme is LD1 and the electrophoretically slowest LD5 (Anonymous, 1965), while before the reverse convention was followed in several publications (King and Campbell, 1961).

The same principle or model is valid also for ADH. However, in the article ‘Rare ADH variant constellations are specific for alcohol dependence’, the ADH 7 isoenzyme and not the ADH 1 was denoted as the fastest anodically migrating isoenzyme on starch gel electrophoresis. The authors’ nomenclature is based on the chronology of discovering the ADH isoenzymes where the fastest one was not discovered as the first of all. That means that after the internationally accepted nomenclature proper denotation of rare ADH 7 and ADH 6 variants (upon authors) are ADH 1 and ADH 2.

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