

## **Harmless, minimal alcohol content**

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### 1. Study of forensic medicine institute

In a scientific study, the University of Freiburg under the direction of Prof. Stefan Pollak, Director of the Institute of Forensic Medicine, and Dr. med. Volker Auwärter, examined the effect of ERDINGER Non-Alcoholic on blood alcohol concentration (BAC). Background: beers and other beverages with an alcohol by volume (ABV) level of up to 0.5% are referred to as "alcohol-free" in Germany.

Prof. Stefan Pollak and Dr. Volker Auwärter certified that the isotonic thirst- quencher from Bavaria was completely safe: "Our investigations show that under the realistic drinking conditions selected for the test, the consumption of ERDINGER Non-Alcoholic does not lead to any relevant increase in BAC." In addition, tests were conducted to examine whether there was any impairment of physical and mental abilities: "In the tests of mental and physical abilities which we carried out, there was no measurable impairment. However, given the negligible amount of alcohol in the blood, this was only to be expected," commented Dr. Volker Auwärter.

#### **More accurate than the police**

In their study, the scientists wanted to achieve exact results and used even more accurate measurement methods in their tests than those commonly used by the police. Normally, measurements are only stated up to the second digit after the decimal point. Using this common method, no change in the BAC would have been detected at all after consuming non-alcoholic beverages.

The scientists therefore decided to measure up to the fourth decimal place so that even the smallest change in BAC could be detected. After drinking three bottles (equivalent to 1.5 liters) of ERDINGER Non-Alcoholic in just one hour, the Freiburg study only detected minimal BAC – on average 0.0024‰. A figure less than one eightieth of the level that would lead to sanctions for novice drivers and less than one-hundred-and-twentieth of the 0.30‰ limit, above which it may be considered relatively unsafe to drive (sections 315c / 316 StGB).

Moreover, not even such minimal effects on BAC could be detected for 70% of the test persons. The maximum figure reached was 0.0056‰ in the case of a 72-year-old test person. Just 30 minutes after drinking, no measurable BAC could be detected any more among the test persons.

**“According to the latest study, concerns that the – very low – amount of residual alcohol in non-alcoholic beers may lead to relevant BAC are unfounded.”**

states the acclaimed expert Dr. Volker Auwärter (Institute for Forensic Medicine at the University of Freiburg).

**Table 1** Results of ethanol findings stating the age, sex, and body weight of the respective test person

Test person no.	1 <sup>st</sup> positive test	SAC <sup>a</sup> (g/l)	2 <sup>nd</sup> positive test	SAC <sup>a</sup> (g/l)	Age (years)	Sex	Body weight (kg)
P01	Test 1	Trace <0.001	-	-	42	Male	69
P03	Test 1	0.0014	-	-	56	Female	58
P11	Test 2	0.0017	-	-	21	Female	71
P16	Test 2	Trace <0.001	-	-	47	Male	85
P18	Test 2	0.0036	Test 3	0.0012	21	Female	51
P19	Test 2	0.0037	Test 3	0.0013	21	Female	52
P21	Test 2	Trace <0.001	-	-	20	Male	64
P22	Test 1	Trace <0.001	-	-	19	Male	70
P30	Test 2	Trace <0.001	-	-	30	Female	70
P32	Test 2	0.0015	-	-	29	Female	64
P39	Test 2	Trace <0.001	-	-	23	Female	48
P55	Test 1	0.0026	-	-	20	Male	71
P58	Test 2	Trace <0.001	-	-	25	Female	85
P62	Test 1	0.0011	Test 2	0.0069	75	Male	72
P64	Test 1	0.0019	Test 2	Trace <0.001	68	Male	80
P66	Test 2	0.0013	-	-	22	Male	67
P70	Test 1	0.0040	Test 2	Trace <0.001	47	Female	59
P72	Test 2	0.0043	Test 3	0.0018	70	Female	57
P75	Test 1	0.0038	Test 2	Trace <0.001	19	Female	55
P78	Test 1	0.0013	-	-	20	Female	65

Those 20 out of a total of 67 test persons are listed for whom ethanol could be detected in at least one sample (detection threshold 0.0005 g/l). <sup>a</sup>Serum Alcohol Concentration (average of 4 individual findings).

### **Novice drivers**

There are stricter laws on driving under the influence of alcohol for novice drivers (and persons up to 21 years old). The relevant BAC for them is 0.0‰! With regard to the consumption of non-alcoholic beer, the study recommends the following for novice drivers:

**“Even after considerable consumption of non-alcoholic beer, novice drivers do not have to fear any negative legal consequences. Also in connection with other forensic questions, the BAC detected give no cause to consider any psychophysical effect from alcohol.”**

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Abstract

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### **Maximum blood alcohol concentration after considerable consumption of non-alcoholic beer**

#### **Summary**

In recent years, sales of non-alcoholic beer have steadily increased. According to German food law, this “alcohol-free” beverage is allowed to have a maximum ABV of <0.5%. For certain groups of people, even this low level of ethanol might lead to problems. Section 24c of the German Road Traffic Act (StVG) includes a strict alcohol ban for novice drivers, for example. As no reliable data on blood alcohol concentration (BAC) after consuming “alcoholic-free” beer are available, a corresponding drinking test was conducted: after 5 days of alcohol abstinence, a total of 78 test persons were asked to drink 1.5 liters of non-alcoholic beer with an ABV of 0.41-0.42% within 1 hour. Blood samples were taken at intervals of quarter and half an hour. The blood samples were tested for ethanol using headspace gas chromatography with flame ionization detection (HS-GC-FID). A BAC was detected (limit of detection (LOD) 0.005 g/l) for 20 of the 67 persons taking part in the test. The maximum concentration detected was 0.0056‰. Even after considerable consumption of non-alcoholic beer, novice drivers do not therefore have to fear any negative legal consequences. Also in connection with other forensic questions, the BAC detected give no cause to consider any psychophysical effect from alcohol.

#### **Key words**

Ethanol/consumption and dose

Gas chromatography mass spectrometry

Young adults

Car driving

### **Background – non-alcoholic beverages in Germany**

In Germany, beverages with an ABV of up to 0.5% are referred to as “alcohol-free”. This goes back to an initiative of the fruit juice industry in 1954, as juices – especially natural juices – can sometimes ferment slightly and thus have a low alcohol content. This phenomenon also occurs in kefir and even some black bread varieties. However, since no alcoholizing effect has ever been observed, the 0.5% limit is still respected. The study conducted by the University of Freiburg underlines the sense of this figure.

### **Body's own alcohol production**

Also interesting in this context are the scientific studies on the body's own (endogenous) production of alcohol. BAC of up to 0.015‰ have been measured for some people. In the present study, endogenous alcohol production was only found in 4% of the test persons. The BAC did not exceed 0.001‰. So no need to raise your hopes: such endogenous production is not going to be accepted as an explanation for driving under the influence of alcohol – just as the consumption of ERDINGER Non-Alcoholic would not be accepted as an excuse.

## 2. Alcohol-free signal

"Alcohol-free" is the clear signal we have learned to accept over the past decades: whether you're driving, in the office, or replenishing fluids after sport – "alcohol-free" on the bottle means it's always safe to drink this beer. "Alcohol-free" means "free of any alcoholizing effect". If "alcohol-free" were not printed on the beer's label, consumers would be uncertain – as they always associate "beer" with alcohol.

The situation is different for other common foodstuffs containing alcohol, such as organic juices, black bread, kefir and many more. In these cases, the consumer assumes their intrinsic safety (or simply doesn't know that they also contain alcohol). Consequently, these foodstuffs don't need to include "alcohol-free" on their label – in contrast to non-alcoholic beer.

### **Free is not always free**

It is not uncommon for foods to be labeled "-free" even if minor amounts of the respective ingredient are still present. In the case of "sugar-free", for example, there is a residual amount of 0.5g of sugar per 100g/ml, and 0.5g of fat per 100g/ml for "fat-free" products – in other words, comparable figures to those of "alcohol-free" beer.

### **People only drink non-alcoholic beer if they enjoy the taste**

The minimal alcohol content plays a vital role for the acceptance of non-alcoholic beers. As a flavor carrier, it is solely responsible for giving the beverage its full-bodied and beer-like taste – thus making non-alcoholic beers a genuine alternative for beer lovers. Although technically possible, the complete dealcoholization of beer makes no sense as it results in loss of flavor. The brewing process required for 0.0% beers further enhances this effect: the physical processes impair or almost completely remove important aroma substances (e.g. certain bitter substances). In addition, the body can absorb the health-promoting polyphenols better if the beer has a minimal alcohol content. It's also interesting to take a look at Germany's wine regulations, as these also list wine with an ABV of 0.5% as "alcohol-free". However, according to the regulations, this figure is also the minimum alcohol content for the term "wine" to be legally used. In other words, such a marginal alcohol content is necessary to guarantee both the flavor and health-specific qualities which make wine a "wine". If these wine regulations were transferred to the beer market, then 0.0% beers could not even be marketed as "beer".



### 3. Alcohol content of common foodstuffs



Source:

Windirsch et al. (2007): Alkoholgehalte ausgewählter Lebensmittel. *Ernährung / Nutrition*, 31 (1) 24-28.

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### 3. Questions and answers

#### **Does ERDINGER Non-Alcoholic contain any alcohol?**

ERDINGER Non-Alcoholic has a minimal alcohol content of less than 0.5% (ABV). This minimal alcohol content is completely harmless. This is proven by scientific studies – the most recent of which was conducted by the Institute for Forensic Medicine of the University of Freiburg’s Medical Center in 2010: “In the tests of mental and physical abilities which we carried out, there was no measurable impairment,” stated Dr. Volker Auwärter. His test subjects had consumed 1.5 liters of non-alcoholic beer (three 0.5-liter bottles of ERDINGER Non-Alcoholic) in just one hour.

#### **Can I get drunk from non-alcoholic beer?**

No. The minimal alcohol content of non-alcoholic beers is completely harmless. It has no alcoholizing effect. This has been proven by numerous scientific studies and examinations conducted by doctors – and confirmed of course by our experience made with non-alcoholic beers over around 40 years. This is the only reason why German law has allowed the term “alcohol-free” since 1972.

#### **How much alcohol can non-alcoholic beer generally contain?**

Under German law, beers with an alcohol content of up to 0.5% (ABV) have been allowed to call themselves “alcohol-free” since 1972.

#### **Why do non-alcoholic beers contain small traces of alcohol?**

We brew our ERDINGER Non-Alcoholic in such a way that it retains its distinctive, full-bodied and beery taste – as well as its valuable ingredients, such as the vitamins B12 and B9, and polyphenols. This would be impossible with an ABV of 0.0%.

#### **Why is this not possible?**

Because important flavors, such as certain bitter substances, are impaired or completely removed during the physical processes involved in this brewing method.



### **Why don't breweries at least refrain from calling their beers "alcohol-free" if they're not completely free of alcohol?**

"Alcohol-free" is the clear signal we have learned to accept over the past decades: whether you're driving, in the office, or replenishing fluids after sport – "alcohol-free" on the bottle means it's always safe to drink this beer. "Alcohol-free" means "free of any alcoholizing effect". That's exactly why we'll continue to call our isotonic thirst-quencher "alcohol-free". Otherwise, consumers would be confused: "Can I or can't I drink it?" – a completely unnecessary concern.

It's also not uncommon for foods to be labeled "-free" even if minor amounts of the respective ingredient are still present. In the case of "sugar-free", for example, there is a residual amount of 0.5g of sugar per 100g/ml, and 0.5g of fat per 100g/ml for "fat-free" products – in other words, comparable figures to those of "alcohol-free" beer.

### **Why do you write the alcohol content on the back label?**

The Federation of German Consumer Organizations and the German Brewers Association have mutually agreed that breweries can voluntarily state minimal and harmless alcohol content on the back label. We decided to implement this recommendation. In this way, we can also meet the growing consumer desire for complete transparency. Incidentally, we've been stating the beer's minimal alcohol content on the Internet for many years.

### **Doesn't putting the information on the back label make it too difficult for the consumer to find?**

The main thing is that consumers first see the clear and well-known signal: whether you're driving, in the office, or replenishing fluids after sport – "alcohol-free" on the bottle means it's always safe to drink this beer. "Alcohol-free" means "free of any alcoholizing effect". The front label provides consumers with basic and essential orientation on what kind of product they're buying. On the back, there are then further details such as nutritional value and vitamin content. And that's why the beer's minimal and harmless alcohol content belongs exactly here. It would be counterproductive to print the minimal alcohol content on the front as it would only confuse the consumer.

### **Why is the alcohol content included on the label of some bottles and not on others?**

That's for reasons relating to our production technology. We've been using new labels stating the minimal alcohol content since the end of May this year. As a result, there are still some ERDINGER Non-Alcoholic bottles in the stores with the old label produced in the first months of 2014. Obviously, the same figures apply to these bottles with regard to their minimal alcohol content – ERDINGER Non-Alcoholic has been brewed in the same way for years. By the end of the year at the latest, all bottles with the old label should have been used up.

### **Should pregnant women drink non-alcoholic beer?**

Psychological factors also play an important role during pregnancy. Pregnant women have to feel good and certain about what they're doing. We therefore always recommend that they consult their gynecologist or midwife. This is the only way we can deal with the understandable concerns that arise in this particular situation.

### **Is the consumption of non-alcoholic beer a problem for recovering or recovered alcoholics?**

We cannot make an assessment on whether consuming ERDINGER Non-Alcoholic is safe for "dry" alcoholics, as we don't know the individual circumstances. We recommend former alcoholics to seek the advice of their doctor or a specialist.

### **So that means children and adolescents can drink non-alcoholic beer?**

No, we don't recommend that. It's impossible to estimate the danger of mixing up bottles or the possibility that children and adolescents might get used to the appearance and taste of alcoholic beer.