



The Benefits of Moderate Beer Consumption



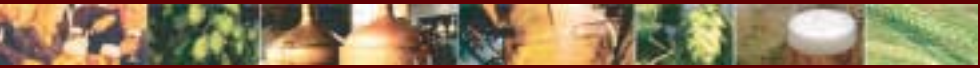
THE BENEFITS OF MODERATE

Beer Consumption

Third Edition
The Brewers of Europe
2004

Acknowledgements

The editor would like to thank Dr Caroline Walker of Brewing Research International (BRI) for her help and expertise in the subject and the Centre for Information on Beverage Alcohol (CBA) and the Centro de Información Cerveza y Salud (CICS, Spain) for their help to assemble the references cited in the text.



Contents

3	CONTENTS
4	PREFACE
6	MODERATION AND RESPONSIBILITY ARE THE KEY WORDS
8	MODERATE CONSUMPTION OF BEER CAN BE GOOD FOR YOUR HEART
12	BEER IS JUST AS GOOD AT PROTECTING THE HEART AS WINE
14	COMPLICATING FACTORS
16	OTHER BENEFICIAL EFFECTS FROM MODERATE BEER CONSUMPTION
20	GENERAL HEALTH EFFECTS OF MODERATE CONSUMPTION OF BEER AND OTHER ALCOHOLIC DRINKS
22	BEER CAN MAKE A POSITIVE CONTRIBUTION TO A HEALTHY DIET!
24	POTENTIAL BENEFITS FROM THE NATURAL INGREDIENTS IN BEER
25	Antioxidants
26	Vitamins
26	Minerals
27	Hops
28	THE PROBLEM OF OBESITY – BEER IS NOT TO BLAME
30	DRINKING BEER IN MODERATION DOES NOT MAKE YOU FAT!
32	A MATTER OF LIFESTYLE!
34	REFERENCES

Preface

This booklet summarises the current state of knowledge on the beneficial effects associated with moderate consumption of alcoholic drinks, in particular beer. The hundreds of different types of beer that are brewed across Europe share the established beneficial effect associated with alcohol content and the potential benefits which may be associated with the natural raw materials from which beer is brewed.

This edition has been compiled by the Brewers of Europe to inform the general public of the clear evidence that beer, a wholesome beverage and a staple part of our diets for thousands of years, is not only good to drink but may also be good for health when consumed moderately.

The information is not intended to encourage people who do not drink beer for whatever reason to start to consume beer, or other drinks, on health grounds. The intention is to inform and reassure those who enjoy drinking beer that, when consumed moderately, it is not a health risk and there may be a net benefit.

Although, for the population as a whole, moderate alcohol consumption may offer significant health benefits, the negative health effects of excessive consumption of alcoholic drinks are clear. These have been well documented elsewhere and are not covered in this booklet.

The first and second editions of this booklet were inspired by two one-day seminars on the health benefits of moderate alcohol consumption and the healthful properties of beer held in November 1999 and October 2001. These can be found on the Brewers of Europe website www.brewersofeurope.org.

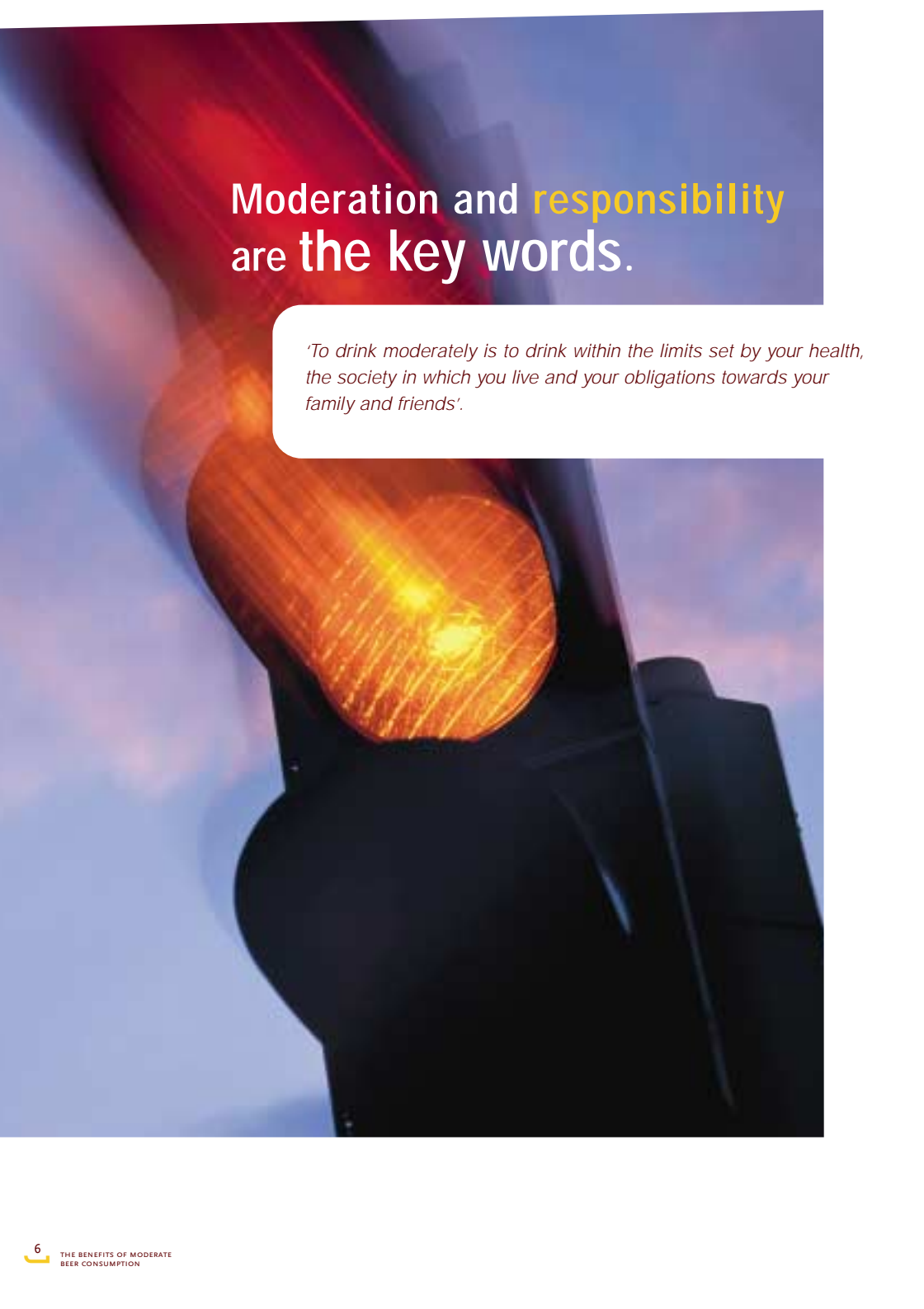


This, the third edition, follows a further symposium held in October 2003 during which experts from across Europe examined the latest scientific evidence on this subject. Speakers included Dr. Gerard Vachonfrance, France: Prof. Dr. Med. Ulrich Keil, Universität Münster, Germany: Prof. Emeritus Ivo De Leeuw, University of Antwerp, Belgium: Dr. Henk Hendriks, TNO, The Netherlands: Prof. Jonathan Powell, St Thomas' Hospital, London, UK: Prof. Dr. Med. Arne Astrup, Denmark: and Dr. Ascensión Marcos, Spain. Their presentations, and their emphasis on the importance of lifestyle, are the main reasons for the Brewers of Europe being inspired to revise this edition.

At the first Beer and Health Symposium the Chairman concluded that beer played a part, along with other alcoholic drinks, in reducing the risk of heart disease and there was also preliminary evidence of benefits of beer consumption, which may be different from those of other drinks, which warranted more detailed investigation. Since then research has progressed and some new results and ideas about the health benefits of beer consumption have now been published.

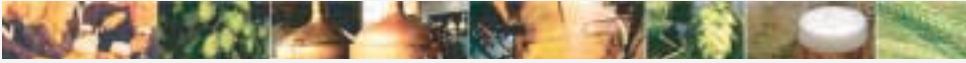
This edition provides an overview of the published research on the proven and potential benefits of moderate beer consumption. It includes an updated section on the reduced risk of coronary heart disease and more detailed information about the growing number of additional benefits associated with moderate consumption. Many new references are cited in support of this evidence and the research into the benefits which may be associated with the natural raw materials from which beer is made. Finally the sections describing the importance of a healthy lifestyle and the lack of evidence of a link between moderate consumption and obesity has been revised in the light of the most recent research.

Janet Witheridge
Editor.



Moderation and **responsibility** are the key words.

'To drink moderately is to drink within the limits set by your health, the society in which you live and your obligations towards your family and friends'.



This booklet concentrates on the effects of responsible consumption of beer. It must be stressed that the beneficial effects reported apply only to moderate consumption by healthy adults. Heavy drinking, whether in binges or regularly, can be harmful and is associated with many chronic health problems.

Dr Skovenborg, speaking at the second symposium, defined moderation in the following terms. “To drink moderately is to drink within the limits set by your health, the society in which you live and your obligations towards your family and friends: 1 – 3 drinks a day for most men”. “Women are more sensitive to alcohol so they are advised to drink less than men: 1 to 2 drinks a day.”

The amount of alcohol in “a drink” of beer can vary considerably depending on the size of the glass and the alcoholic strength and will differ slightly across Europe according to historic traditions and customs. “A drink” here, and when referred to in other parts of this booklet, is defined as a 0.25litre glass (approximately half a pint of beer in the UK or Ireland) with a strength of between 4 and 5 per cent alcohol by volume (% abv). This would have an alcohol content of about 10g.

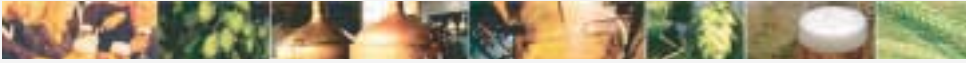
While these are useful guidelines it must be remembered that they only apply to healthy adults and there are some situations where even moderate drinking means misuse. Examples of situations where it may not be appropriate to drink at all include during pregnancy, before driving or operating machinery or when taking certain medication.

The brewing industry is mindful of the dangers of alcohol misuse. To this end it has produced numerous educational programmes and campaigns to avoid misuse such as those to prevent drink-driving and discourage drinking by people under the legal drinking age. A recent publication by the Worldwide Brewing Alliance lists more than 360 initiatives funded by the brewing industry worldwide. It is available on the website of The Brewers of Europe www.brewersofeurope.org



Moderate consumption of beer
can be **good for your heart.**

'There is strong evidence that moderate drinkers have a substantially reduced risk of heart attack.'



Coronary heart disease or heart attack is the leading cause of premature death in the developed world. Preventive measures include modification of lifestyle factors such as adopting a healthy diet and taking exercise. Moderate consumption of beers, wines and spirits can be part of that healthy lifestyle.

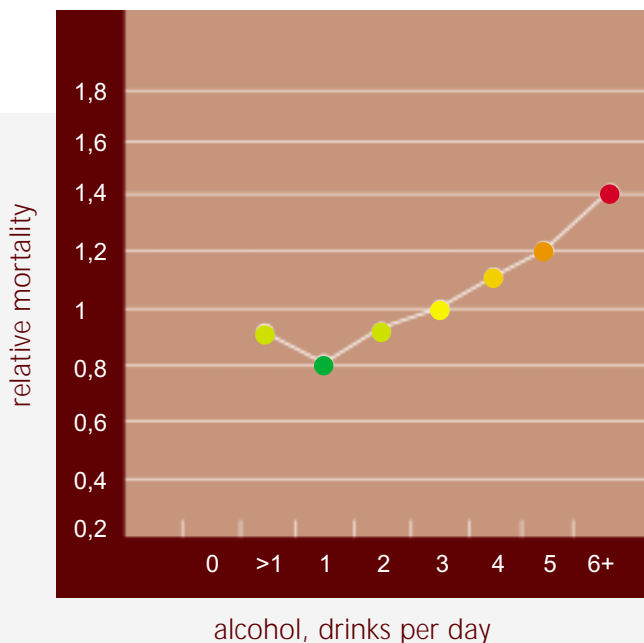
There is strong evidence that people who are moderate consumers of alcoholic drinks (beers, wines or spirits) have a substantially reduced risk of coronary heart disease when compared to teetotallers and heavy drinkers¹. This has been shown in many studies throughout the world.

This reduction in risk (associated with approximately 3 alcoholic drinks a day) is on a par with other preventive measures such as the use of aspirin, weight control, and exercise².

The benefit applies to a broad range of individuals including those considered to be of higher risk of cardiovascular disease³ or who have diabetes^{4,5}.



The “J shaped curve” (shown below) illustrates the effect that this reduction in the risk of coronary heart disease has on the risk of deaths from all causes. At moderate levels of consumption of alcoholic drinks the risk of early death is reduced relative to the risk in abstainers and heavy drinkers.



• *Figure 1: Alcohol and Mortality.*
Source: “Alcohol drinking and mortality amongst men enrolled in an American Cancer Society prospective study”⁶.

There are several well-established explanations for this observed reduction in risk of coronary heart disease including the following:



- **Blood Cholesterol levels**

The mechanism which has been shown to be responsible for the majority of the effect, is that the amount of 'good fat', (HDL cholesterol), in the blood increases when alcohol is consumed. Higher levels of 'good fat' have been shown to be associated with lower risk of coronary heart disease. Research has shown that one glass of beer a day can significantly increase HDL cholesterol levels⁷.

- **Clotting**

Scientists have also shown that alcohol has a beneficial blood thinning effect and reduces the tendency of blood to form clots⁸.

- **Inflammation**

Some researchers have suggested that alcohol may also have an anti-inflammatory effect and there is increasing evidence that atherosclerosis, which leads to heart attacks, is an inflammatory disease. Several recent studies have shown that moderate alcohol consumption⁹, including moderate beer consumption^{10,11} caused a significant decrease in inflammation.

- **Insulin resistance**

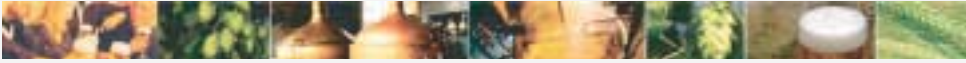
Moderate alcohol consumption may be associated with lower levels of insulin resistance. Insulin resistance is linked to cardiovascular disease, so this may be an additional mechanism by which alcohol consumption reduces risk of cardiovascular disease¹². Insulin resistance is also associated with diabetes mellitus (see page 17).

There is also evidence that light to moderate drinking may be protective against other cardiovascular diseases including the most common form of stroke¹³ and it has also been shown to be associated with a slight decrease in cardiovascular and total mortality in people who have already had a heart attack¹⁴.

An elderly couple stands on a sandy beach, looking out at the ocean. The man on the left wears a dark beret and a brown jacket. The woman on the right has white hair and glasses, wearing a grey jacket. The ocean is blue with white waves breaking on the shore under a clear sky.

beer is just as good as
protecting the **heart** as wine

'It is the alcohol that is having the protective effect and no individual type of drink can claim the monopoly'.



There have been many studies, which have attempted to compare the effect of beer, wine and spirits to see whether they are equally protective against cardiovascular disease but when the evidence is examined it is clear that the major protective agent is alcohol itself¹⁵. The protective effects of alcohol consumption are seen in many different countries with different cultures and drinking habits and this, combined with the established mechanisms described above, confirms that it is the alcohol that is having the protective effect and no individual type of drink can claim the monopoly¹⁶ in relation to cardiovascular disease.

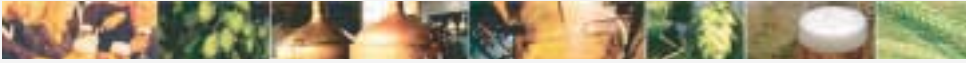
Population studies usually show that the beverage most widely consumed in the population being studied shows the greatest benefit¹⁷. For example, in Germany and the Czech Republic, where beer is the favourite drink, research has confirmed the beneficial effect of beer^{18,19,20}.





Complicating factors

'It is vital that lifestyle factors are compensated for in any research into the effects of alcohol on health'.



There are many other factors, apart from what people drink, that influence their health. These factors include such issues as diet, social status, lifestyle, health behaviour and pre-existing disease which, to some extent, are determined by familial, social and cultural environments. Several publications have suggested that wine confers more health benefits than beer²¹ but it now seems that dietary habits, other lifestyle differences connected with wine preference and even personality may explain this apparent difference^{22,23,24}. For example, in some places, wine drinkers are more likely to have a better diet and exercise more and are less likely to smoke. They may also have a better education and a higher income and social status which are independently associated with better health. It is therefore vital that these factors are compensated for in any research into the effects of alcohol on health.

Another consideration is not just 'how much' but 'how often'²⁵, in other words 'the manner or pattern in which' people are drinking²⁶. The latest surveys show regular light to moderate consumption confers the lowest risk of heart attack¹⁷; people who occasionally 'binge' (in academic literature 'binge drinking' is usually defined as five or more alcoholic drinks consumed in one sitting) show an increased risk of coronary heart disease even when their consumption over a week is moderate²⁷ and may not benefit from the reduced risk of type II diabetes seen in moderate consumers²⁸. Plausible explanations for this include an increased risk of high blood pressure in binge drinkers.

It is also thought that consuming alcoholic drinks with a meal is better than drinking on an empty stomach although the researchers are not unanimous on this subject¹.



Other beneficial effects from **moderate** beer consumption

'Research evidence is also growing that regular moderate consumption of alcoholic drinks may be protective against many other conditions'.



Research evidence is also growing that regular light or moderate consumption of alcoholic drinks may be protective against many other conditions. The reasons for these beneficial effects are not yet clearly understood and more research is needed to explain the mechanisms. As with cardiovascular disease a little seems to be protective whereas heavy consumption is harmful. Neither can the benefits usually be tied convincingly to one particular type of alcoholic drink.

- **Diabetes Mellitus**

Late onset diabetes (type II diabetes mellitus) is a growing health problem in the Western world affecting between 6 and 8 per cent of the population. It is associated with many life-threatening complications including cardiovascular disease.

Several studies have reported a lower prevalence of late onset diabetes in regular moderate drinkers²⁸. The decreased risk has been shown to be considerable (about half) in both men²⁹ and women³⁰. It is thought that moderate alcohol consumption has beneficial effects on insulin sensitivity and that this may explain some of the reduced risk compared to abstainers and heavy drinkers³¹.

- **Weakening of bones**

Osteoporosis (weakening of bones) is common in elderly people especially in women after the menopause. Weak bones are at greater risk of fracture.

Many studies suggest that light to moderate consumption of alcoholic drinks have a beneficial effect on bones which could reduce the risk of osteoporosis³² and fractures. This protective effect could be partly explained by an increase in blood oestrogen levels associated with alcohol consumption in women³³ but this does not fully account for the effect. Research is underway to confirm whether the flavonoid content of beer or minerals such as silicon, which are present in some drinks, especially in beer, have an additional beneficial effect (see page 27).

- **Dementias**

More than 3 million elderly people (65+) in the EU have dementia (cognitive decline associated with aging) and as life expectancy increases, dementia is becoming more prevalent and of increasing concern.

Several studies have indicated that light to moderate consumption of alcoholic drinks is associated with a reduced risk of developing senile dementia and some show a considerable (about a quarter) reduction in risk^{34,35}. There are several possible explanations for this beneficial effect which include: the reduced narrowing of blood vessels in the brain (similar to cardiovascular disease): the psychological benefits of moderate alcohol consumption: or possibly the decreased risk of diabetes. More research is needed before this apparent effect can be fully understood.

Researchers do not yet agree on whether alcohol consumption affects Alzheimer's disease, and both increased and decreased risks have been reported. A study which looked at the risk of Alzheimer's disease with alcohol by type found a reduction of risk for all drinks but the only statistically significant finding was for wine (50 per cent reduction in risk) and it is possible that other lifestyle factors are important in determining risk for this condition³⁶.

There is also evidence that participation in social leisure activities, such as going to pubs and bars, visiting friends or involvement in clubs helps delay cognitive decline associated with aging³⁷.

- **Parkinson's Disease**

Parkinson's Disease is a common neurodegenerative disease mainly affecting people over the age of 50.

Several studies have found that moderate alcohol consumption, including moderate beer drinking³⁸ and some additional lifestyle factors are associated with a lower risk of developing Parkinson's disease³⁹.

- **Gallstones**

Development of stones in the gall-bladder is one of the most common and costly digestive diseases in Western populations. By the age of 60 almost 30 per cent of men and women will have gallstones.

Several studies have shown an association between moderate alcohol consumption and a decreased risk of developing gallstones⁴⁰. This has been reported with consumption of all types of alcoholic beverages and the risk is lowest in those who consume frequently. There are several plausible explanations for this finding which include the effect of alcoholic drinks on cholesterol levels and reduced bile concentration.

- “Well being” (Psychotherapeutic value)

“One of the main reasons why the moderate drinking of alcoholic beverages is a common practice is that many people enjoy the relaxing, pleasant effect produced by one or two drinks” and “the psychotherapeutic value of this should be regarded as a potential health benefit⁴¹”.

Positive psychological benefits associated with moderate intake of alcoholic drinks are acknowledged by many experts but are more difficult to demonstrate scientifically. A recent review of the literature confirmed earlier findings that alcohol in moderate amounts is effective in reducing stress and tension and increasing feelings of well being⁴². The review found that, “to a greater degree than either abstainers or heavy drinkers, moderate drinkers have been found to experience a variety of psychological benefits”. More research is needed to explain mechanisms to account for the improved functioning and the part, if any, played by the social setting.

- General health

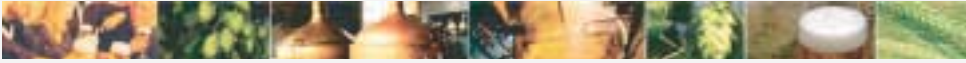
Researchers have also reported that people who drink moderately report “good health”⁴³ and believe they are more healthy⁴⁴. This results in them feeling better about and having more positive attitudes to their health.





General health effects of moderate consumption of beer and other alcoholic drinks

'For some individuals the risk of alcohol consumption, even in moderation, may outweigh any potential benefits'.



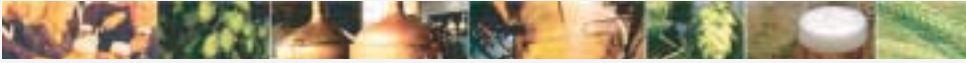
A large body of scientific evidence associates the moderate intake of alcoholic drinks with reduced mortality among middle-aged and older people in industrialised societies. This association is due largely to the reduced risk of death from coronary heart disease (heart attack) which appears to outweigh the possible adverse effects of moderate drinking⁴¹. However, these results apply to the population as a whole, and cannot be taken as medical advice on an individual basis. For some individuals the risk of alcohol consumption, even in moderation, may outweigh any potential benefits. For example, alcohol consumption has been associated with a slightly elevated risk of breast cancer⁴⁵. On an individual basis general practitioners will be able to assess their patient's risk more precisely in the light of their health and family history of this condition. Similar considerations apply to those at risk of certain types of stroke and high blood pressure.





Beer can make a **positive**
contribution to a **healthy diet!**

'Beer contains essential vitamins and minerals and can contribute to a healthy balanced diet'.



Beer is made from wholesome raw materials, malted barley, cereals, hops, yeast and water. All these are natural substances which contribute to a healthy, balanced diet. As with any natural food, thousands of components can be identified in beer including antioxidants, vitamins (particularly B vitamins), minerals such as silicon and fibre.

Beer is 93 per cent water and is a thirst quenching long drink which is relatively low in alcohol. In general lower strength drinks, like beer, have been shown to be absorbed more slowly from the stomach leading to lower blood alcohol concentrations⁴⁶.

While moderate consumption of beer can provide many essential vitamins and minerals⁴⁷ it is important to remember that no single source can provide the full range of elements essential for life so beer must always be consumed in moderation as part of a balanced diet.





Potential benefits
from the **natural** ingredients
in beer

'Vitamins and antioxidants could also be protective'.



Scientists who have studied the reduced risk of coronary heart disease in beer drinkers report that the reduction in risk is greater than would be expected from the alcohol alone and speculate that other factors in beer such as vitamins and antioxidants could also be protective⁴⁸.

Research which has looked at the properties of alcohol-free beer indicates that the potential beneficial effects from the natural ingredients are likely to apply equally to this type of beer⁴⁹.

Beer is also a source of soluble fibre which is derived from the cell walls of barley. Two glasses of beer contains an average of 10 per cent of the recommended daily intake of soluble fibre and some beers can provide up to 30 per cent⁵⁰. Other than keeping you regular, fibre has a further benefit by slowing down the digestion and absorption of food and reducing cholesterol levels which may help to reduce the risk of heart disease⁵¹.

Some research has shown that people who drink beer moderately have a degree of protection from the bacterium *Helicobacter pylori*⁵² which is known to cause the majority of stomach ulcers and may be a risk factor for stomach cancer. Beer (and wine) consumption is thought to facilitate eradication of the organism possibly due to an antibacterial effect.

- **Antioxidants.**

Natural antioxidants are found in fruits, vegetables and cereals. They are present in beer, where they come from both the malt (barley) and hops as ingredients⁵³. The total amount of antioxidants in beer will depend on the style of beer and therefore the raw materials and the brewing process used.

Per drink (of equivalent alcohol content), beer contains more than twice as many antioxidants as white wine, although only half the amount in red wine⁵⁴. However, many of the antioxidants in red wine are large molecules and may be less readily absorbed by the body than the smaller molecules found in beer. Research has shown that the antioxidant content of blood is raised following beer consumption suggesting that the antioxidants in beer are readily absorbed⁵⁵ and perhaps more readily than that from solid foods⁴⁹. Researchers working on animals have suggested a direct effect of antioxidants in beer reducing the risk of cardiovascular disease⁵⁶.

The health significance of antioxidants is that they may play a role in the protection against cancer through their action against free radicals⁵⁷. They are also thought to reduce the risk of heart attacks by inhibiting blood clotting⁵⁸. Thus the anti-oxidants in beer may have a positive health effect on the consumer.

- **Vitamins.**

Like bread, which is also made from cereal, beer is a good source of many vitamins which are essential for life. To make beer the barley is sprouted first (malted) which actually increases the nutritional value of the cereals used. Beer is particularly rich in most of the B type vitamins for example niacin, riboflavin (B2), pyridoxine (B6) folate (B9) and Cobalamin (B12). For those vegetarians who enjoy drinking beer this is a natural source of B12. (Table 1 shows the percentage of the recommended daily intake of certain vitamins and minerals found in half a litre of beer.)

As well as adding to a healthy diet, the vitamins and minerals in beer may confer additional health benefits. Recent research suggests that the B vitamins (B6, B9 and B12) may give beer drinkers additional protection against cardiovascular disease compared to drinkers of wine or spirits⁵⁹. Population studies in USA, UK, France, Spain and the Czech Republic all confirm that moderate beer consumption, in contrast to other alcoholic drinks, reduces homocysteine levels and suggest that this may be due to beer's high B vitamin content^{60,61,62,63,64}. High homocysteine levels, like "bad cholesterol" (LDL), are associated with a higher risk of heart attacks. Clinical research is underway to examine whether the folate in beer can reduce homocysteine levels.

- **Minerals.**

Beer has a favourable balance of some essential minerals. It is relatively high in potassium and low in sodium⁶⁰. It is low in calcium and is rich in magnesium which may help to protect against gall stones and kidney stone formation. This may be one reason why daily consumption of a glass of beer was reported to reduce the risk of kidney stones⁶⁵; of course the increased intake of water may also play a part here.

Moderate alcohol consumption is associated with higher bone mineral density (see page 17) but few studies have looked specifically at the effect of different drinks. Silicon intake is associated with healthy bones⁶⁶ and has been shown in laboratory experiments to improve several aspects of human bone formation⁶⁷ and

increase bone mineral density in animals when taken orally⁶⁸. It has also been shown to improve bone mineral density in women given dietary silicon supplements⁶⁹.

Beer is a rich source of dietary silicon which is readily absorbed by the body⁷⁰ and has been shown to be the major contributor of silicon in men's diet⁷¹. This silicon comes from two natural sources - water and barley⁷². Research is underway which will investigate whether the dietary silicon provided by moderate beer consumption actually protects against osteoporosis. This may explain in part the protective effect described above.

• *Table 1: Some vitamins and minerals in beer.*

Vitamin	Average contents per half litre of beer*	% of recommended daily intake per half litre of beer**
B12 Cobalamin	0.9 micrograms	50
B2 Riboflavin	150 micrograms	8
B6 Pyridoxine	150 micrograms	8
Biotin	2.5 micrograms	8
Niacin	1.5 mg	7
B9 Folate	20 – 60 micrograms	5 - 22
Pantothenic Acid	500 micrograms	4
Mineral	Average contents per half litre of beer*	% daily intake per half litre of beer**
Magnesium	50 mg	12
Potassium	200 mg	12
Silicon	10 mg	-

*Amount in an average (typical) beer **Recommended levels vary across Europe
Source: McCance and Widdowson's "The composition of Foods".

• Hops.

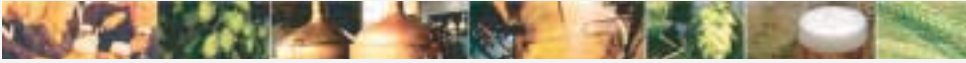
Small quantities of the "flowers" from hops are used to preserve and flavour beer. Beer is the only significant dietary source of hops so any potential health benefits they have are unique to beer. Many studies have shown that the flavonoids in hops, have the potential to protect against some diseases and help fight some types of cancer⁷⁴. Most of this research has been done in the laboratory but additional research is planned to investigate the potential effects in animals and people⁷⁵.

Hop flavonoids are present in beer⁷⁶ but as yet their effect on human health is not fully understood.

A man with glasses and a blue checkered shirt is pouring beer from a brass tap into a glass. The tap has two signs: one with a polar bear and the text 'Polar Bear' and another with a man's face and the text 'Max's Big Head Brew'.

The problem of obesity beer is **not** to blame

'Until recently it has been assumed that consumption of alcoholic drinks has been adding to the cause of the obesity epidemic but this has now been shown to be unjust'.



The prevalence of obesity in the EU has trebled in the last 20 years. In 2001 15-25 per cent of men and women were clinically obese (Body Mass Index (BMI) >30 kg/m²) and a further 50 per cent were overweight (BMI 25-30 kg/m²). If these trends continue 30 per cent of the adult population will be obese by 2010.

Obesity is a significant health problem because it is associated with many other types of ill health including type II diabetes, cardiovascular disease and liver cirrhosis and is thought to reduce overall life expectancy by approximately 10 years. It is strongly influenced by lifestyle and many factors can account for a change in body weight such as smoking, calorie intake, fat intake, activity level and socio-economic status.

Until recently it has been assumed that consumption of alcoholic drinks, and beer in particular, has been adding to the cause of the obesity epidemic but this has now been shown to be unjust where moderate consumption is concerned. (Heavy consumption is associated with increased weight and several studies have indicated this⁷⁷.)

Moderate alcohol consumption (10 – 30g per day) represents about 10 per cent of total energy intake in developed countries. Despite these “additional” calories several recent studies have confirmed that moderate consumption of alcoholic drinks does not lead to increased weight in men and is associated with reduced weight in women^{78,79,80,81}. The reason for this continues to be a matter of debate⁸². One possible reason is that consuming alcoholic drinks with meals may stimulate energy expenditure⁸³ but it is difficult to recognise and statistically account for all the lifestyle factors such as level of physical activity and it is probable that several factors are involved.

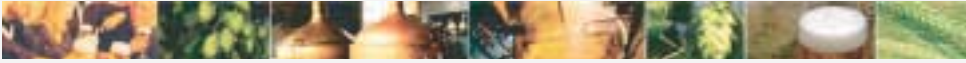
One study tested the effect of wine, beer and soft drink served with a normal meal, on food and total energy intake in non obese men⁸⁴. The conclusion was that alcoholic beverages, and wine in particular, may enhance total energy intake at a meal relative to a soft drink when served ad libitum.

The way in which people consume alcohol also influences weight and drinkers who consume small amounts of alcohol on a regular basis (daily) were shown to be slimmer than those who only binge occasionally⁸⁵.



Drinking **beer** in moderation
does **not** make you fat!

'Drinking beer does not seem to make you fat, provided that it is consumed in moderate amounts'.



Beer does not contain fat or cholesterol and is low in free sugars. The calories in beer come largely from the alcohol content. Beer is lower in calories than other drinks but tends to be drunk in larger quantities (see Table 2).

The term “beer belly” is associated with obesity in beer drinkers in several parts of Europe but this may not be due to the beer but to other characteristics of beer drinkers. Several studies have shown a link between beer consumption and poor dietary choices^{86,23} and it may be that the “beer belly” results from consumption of food high in calories and rich in fats (see table below).

One recent study set out specifically to test the notion that “beer drinkers are on average, more obese than either non drinkers or drinkers of wine or spirits” and concluded that it is unlikely that beer intake is associated with measures of obesity such as body mass index (BMI) or waist hip ratio (WHR)⁸⁷. This study also showed that in women moderate beer consumption was associated with a lower BMI.

• Table 2: Approximate calorie content in beer and other drinks and in foods often eaten with beer.

Beverages	Calories per 100 ml	Standard serving ml*	Calories per standard serving
Beer-lager (4.6% abv)	41	250	107
Beer (non-alcoholic)**	15	250	38
Table wine (12% abv)	77	150	115
Spirits (40% abv)	250	25	62
Liqueurs (40% abv)	320	25	80
Milk (whole)	64	244	156
Regular Cola/soda	42	370	155
Apple juice (unsweetened)	47	263	123
Orange juice (unsweetened)	42	263	110
Tomato juice	17	242	53
Food	Calories per 100g	Standard serving g*	Calories per standard serving
Crisps	500	50	250
Nuts (salted/roasted)	600	50	300
Hamburger (regular)	250	110	275
Hamburger (large)	309	176	543
Pizza (medium)	270	150	420
Potato Fries	342	134	458
Sausage	300	60	170
sandwich	240	140	350
Bagel	275	100	375

*The size of standard servings varies across Europe

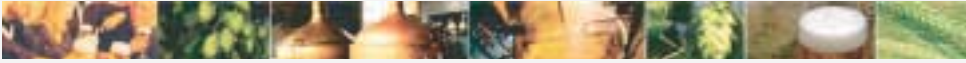
**Not listed on USDA site

Source: www.nal.usda.gov/fnic



A matter of lifestyle!

'Having a healthy lifestyle does not mean giving up drinking beer or other alcoholic drinks provided consumption is moderate'.



The growth in noncommunicable diseases is a major health burden in industrialised countries and research has shown that these illnesses have their roots in unhealthy lifestyles⁸⁸.

One of the key messages referred to by all the speakers at the third Beer and Health Symposium was the importance of lifestyle and the fact that good health is affected by everything we do, including eating a balanced diet, exercising regularly, drinking moderately and giving up smoking.

Life expectancy is increasing and, as a result, conditions such as obesity, diabetes, dementia and osteoporosis are becoming more prevalent in society causing an increasing economic burden on health services and decreasing the quality of life. Consequently research is focussing on risk factors and strategies to prevent such conditions, including lifestyle and dietary factors. Drinking beer in moderation provides refreshment, and enjoyment so it is reassuring for those who do consume beer regularly to know that it can also be a part of a healthy lifestyle.

Another key message from the symposium was that the health benefits described are the result of light to moderate consumption and the effects on health are quite the opposite when consumption levels rise. It is important therefore that information about possible health benefits associated with moderate consumption of alcoholic drinks are not used to encourage consumption of beer or other drinks as a means of promoting health or longer life.

The speakers agreed that the message is complicated. It was clear that it is important to encourage more healthy lifestyles and that heavy consumers should be encouraged to moderate their consumption but the difficulty in defining what moderate or binge drinking really means adds to the confusion. The medical profession is understandably reluctant to advocate moderate drinking to abstainers in order to gain the associated health benefits because of the fear that this might lead to over indulgence or be interpreted as an excuse for some people to drink too much. On an individual basis general practitioners will be able to assess their patient's risk more precisely but the evidence seems to indicate that a healthy lifestyle does not mean giving up drinking beer or other alcoholic drinks provided consumption is moderate.

The research described in this leaflet sums up the current state of knowledge on this subject. More studies are underway to examine whether some of the potentially beneficial components of foods and beverages such as beer, can be used by the body for the prevention of disease.

References

- 1 Rehm J, Sempes CT and Trevisan M. (2003). "Average volume of alcohol consumption, patterns of drinking and risk of coronary heart disease – a review". *Journal of Cardiovascular Risk*, 10:15-20.
- 2 Manson J, Tosteson H, Ridker PM et al. (1992). "The primary prevention of myocardial infarction". *New England Journal of Medicine*, 326(21):1406-16.
- 3 Hendriks HFJ, van Haaren MRT, Leenen R et al. (2001). "Moderate alcohol consumption and postprandial plasma lipids in men with different risks for coronary heart disease". *Alcoholism: Clinical and Experimental Research*, 25:563-570.
- 4 Valmadrid CT, Klein R, Moss SE et al. (1999). "Alcohol intake and the risk of coronary heart disease mortality in persons with older-onset diabetes mellitus". *Journal of the American Medical Association*, 281(3):239-246.
- 5 Tanasescu M, Hu FB, Willett WC et al. (2001). "Alcohol consumption and risk of coronary heart disease among men with type 2 Diabetes Mellitus". *Journal of the American College of Cardiology*, 38(7):1836-1842.
- 6 Bofetta P and Garfinkel L. (1990). "Alcohol drinking and Mortality amongst men enrolled in an American Cancer Society prospective study". *Epidemiology*, 1(5):342-348.
- 7 McConnell MV, Vavouranakis I, Wu LL et al. (1997). "Effects of a single daily alcoholic beverage on lipid and haemostatic markers of cardiovascular risk". *American Journal of Cardiology*, 80(9):1226-1228.
- 8 Rimm EB, Williams P, Fosher K et al. (1999). "Moderate alcohol intake and lower risk of coronary heart disease: meta-analysis of effects on lipids and haemostatic factors". *British Medical Journal*, 319:1523-1528.
- 9 Albert MA, Glynn RJ and Ridker PM. (2003). "Alcohol consumption and plasma concentration of C-Reactive Protein". *Circulation*, 107:443-447.
- 10 Sierksma A, van de Gaag MS, Kluff C and Hendriks HFJ. (2002). "Moderate alcohol consumption reduces plasma C-reactive protein and fibrinogen levels: a randomized, diet-controlled intervention study". *European Journal of Clinical Nutrition*, 56:1130-1136.
- 11 Hoffmeister A, Imhof A, Rothenbacher D et al. (2003). "Moderate alcohol consumption and sensitive markers of inflammation. An atheroprotective link?" *Deutsche Medizin Wochenschrift*, 128: 2237-2241.
- 12 Konrat C, Mennen LI, Cacès E et al. (2002). "Alcohol intake and fasting insulin in French men and women. The D.E.S.I.R. study". *Diabetes and Metabolism*, 28:116-123.
- 13 Reynolds K, Lewis LB, Nolan JDL et al. (2003). "Alcohol consumption and risk of stroke: A meta-analysis". *Journal of the American Medical Association*, 289(5):579-588.
- 14 Muntwyler J, Hennekens CH, Buring JE et al. (1998). "Mortality and light to moderate alcohol consumption after myocardial infarction". *Lancet*, 352:1882-1885.
- 15 Rimm EB. (2000). "Alcohol and cardiovascular disease". *Nutrition: Current Atherosclerosis reports*, 2:529-535.
- 16 Doll R. (1997). "One for the Heart". *British Medical Journal*, 315:1664-1668.
- 17 Mukamal KJ, Conigrave KM, Mittleman MA et al. (2003). "Roles of drinking pattern and type of alcohol consumed in coronary heart disease in men". *New England Journal of Medicine*, 348(2):109-118.
- 18 Keil U, Chambless LE, Döring A et al. (1997). "The relation of alcohol intake to coronary heart disease and all-cause mortality in a beer drinking population". *Epidemiology*, 8(2):150-156.
- 19 Hoffmeister H, Scheipl F-P, Mensink GBM et al. (1999). "The relationship between alcohol consumption, health indicators and mortality in the German population". *International Journal of Epidemiology*, 28(6):1066-1072.
- 20 Bobak M, Skodova Z and Marmot M. (2000). "Effect of beer drinking on risk of myocardial infarction: Population based case control study". *British Medical Journal*, 320:1378-1379.
- 21 Klatsky AL, Friedman GD, Armstrong MA and Kipp H. (2003). "Wine, liquor, beer and mortality". *American Journal of Epidemiology*, 158:585-595.
- 22 Mortensen EL, Jensen HH, Sanders SA et al. (2001). "Better psychological functioning and higher social status may largely explain the apparent health benefits of wine". *Archives of Internal Medicine*, 161:1844-1848.
- 23 Barefoot JC, Grønbaek M, Feaganes JR et al. (2002). "Alcoholic beverage preference, diet, and health habits in the UNC Alumni Heart Study". *American Journal of Clinical Nutrition*, 76: 466-472.
- 24 McGregor D, Murray RP and Barnes GE. (2003). "Personality differences between users of wine, beer and spirits in a community sample: The Winnipeg health and drinking survey". *Journal of Studies of Alcohol*, 64:634-640.
- 25 Britton A and Marmot M. (2004). "Different measures of alcohol consumption and risk of coronary heart disease and all-cause mortality: 11-year follow-up of the Whitehall II cohort study". *Addiction*, 99:109-116.
- 26 Puddey IB, Rakic V, Dimmitt SB and Beilin LJ. (1999). "Influence of pattern of drinking on cardiovascular disease and cardiovascular risk factors – a review". *Addiction*, 94(5):649-663.
- 27 Murray RM, Connett JE, Tyas SL et al. (2002). "Alcohol volume, drinking pattern, and cardiovascular disease morbidity and mortality: Is there a U-shaped function?". *American Journal of Epidemiology*, 155(3):242-248.
- 28 Carlsson S, Hammar N, Grill V and Kaprio V. (2003). "Alcohol Consumption and the Incidence of Type 2 Diabetes: A 20-year follow-up of the Finnish Twin Cohort Study". *Diabetes Care*, 26:2785-90.
- 29 Wannamethee SG, Shaper AG, Perry IL and Alberti KGMM. (2002). "Alcohol consumption and the incidence of type II diabetes". *Journal of Community Health*, 56:542-548.
- 30 Wannamethee SG, Camargo Jr A, Manson JE et al. (2003). "Alcohol drinking patterns and risk of type-2 diabetes mellitus among younger women". *Archives of Internal Medicine*, 163:1329-1336.
- 31 Kenkre PV, Lindeman RD, Yau L et al. (2003). "Serum insulin concentrations in daily drinkers compared with abstainers in the New Mexico elder health survey". *Journal of Gerontology Series A: Biological Sciences and Medical Sciences*, 58(10):M960-963.
- 32 Illich JZ, Brownbill RA, Tamborini RD et al. (2002). "To drink or not to drink: How are alcohol, caffeine and past smoking related to bone mineral density in elderly women". *Journal of the American College of Nutrition*, 21(6):536-543.
- 33 Rapuri PB, Gallagher JC, Balhorn KE and Ryschon KL. (2000). "Alcohol intake and bone metabolism in elderly women". *American Journal of Clinical Nutrition*, 72:1206-1213.
- 34 Zuccalà G, Onder G, Pedone C et al. (2001). "Dose-related impact of alcohol consumption on cognitive function in advanced age: results of a multicenter survey". *Alcoholism: Clinical and Experimental Research*, 25(12):1743-1748.
- 35 Mukamal KJ, Kuller LH, Fitzpatrick AL et al. (2003). "Prospective study of alcohol consumption and risk of dementia in older adults". *Journal of the American Medical Association*, 289:1405-1413.
- 36 Lindsay J, Laurin D, Verreault R et al. (2002). "Risk factors for Alzheimer's disease: A prospective analysis from the Canadian study of health and aging". *American Journal of Epidemiology*, 156(5):445-53.
- 37 Singh-Manoux A, Richards M and Marmot M. (2003). "Leisure activities and cognitive function in middle age: evidence from the Whitehall II study". *Journal of Epidemiology and Community Health*, 57(11):907-913.
- 38 Hernán M, Chen H, Schwarzschild MA et al. (2003). "Alcohol consumption and incidence of Parkinson's Disease". *Annals of Neurology*, 54:170-175.
- 39 Paganini-Hill A. (2001). "Risk factors for Parkinson's disease: the Leisure World Cohort Study". *Neuro-epidemiology*, 20:118-124.
- 40 Leitzmann MF, Giovannucci EL, Stampfer MJ et al. (1999). "Prospective study of alcohol consumption patterns in relation to symptomatic gallstone disease in men". *Alcoholism: Clinical and Experimental Research*, 23(5):835-841.
- 41 Meister KA, Whelan EM and Kava R. (2000). "The health effects of moderate alcohol intake in humans: An epidemiologic review". *Critical Reviews in Clinical Laboratory Sciences*, 37(3):261-296.
- 42 Peele S and Brodsky A. (2000). "Exploring psychological benefits associated with moderate alcohol use: A necessary corrective to assessments of drinking outcomes?". *Drug and Alcohol Dependence*, 60:221-247.
- 43 Rosell M, de Faire U and Hellénus M-L. (2003). "Low prevalence of the metabolic syndrome in wine drinkers – is it the alcohol beverage or the lifestyle?" *European Journal of Clinical Nutrition*, 57: 227-234.
- 44 Guallar-Castillón P, Rodríguez-Artalejo F, Díez Gañán L et al. (2001). "Consumption of alcoholic beverages and subjective health in Spain". *Journal of Epidemiology and Community Health*, 55:648-652.

- 45 Collaborative group on hormonal factors in breast cancer. (2002). "Alcohol, tobacco and breast cancer - collaborative reanalysis of individual data from 53 epidemiological studies, including 58 515 women with breast cancer and 95 067 women without the disease". *British Journal of Cancer*, 87: 1234-1245.
- 46 Baraona E, Abittan CS, Dohmen K et al. (2001). "Gender differences in pharmacokinetics of alcohol". *Alcohol Clinical and Experimental Research*, 25(4):502-507.
- 47 Fuller RK, Littell AS, Witschi JC et al. (1971). "Calorie and nutrient contribution of alcoholic beverages to the usual diets of 155 adults". *American Journal Clinical Nutrition*, 24(9):1042-1052.
- 48 Brenner H, Rothenbacher D, Bode G et al. (2001). "Coronary heart disease risk reduction in a predominantly beer-drinking population". *Epidemiology*, 12(4): 390-395.
- 49 Bourne L, Paganga G, Baxter D et al. (2000). "Absorption of ferulic acid from low alcohol beer". *Free Radical Research*, 32:273-280.
- 50 Bamforth CW. (2002). "Nutritional aspects of beer – a review". *Nutrition Research*, 22:227-237.
- 51 Belil S, Goldman VM, Bistrian BR et al. (1999). "Effect of β -Glucan from oats and yeast on serum lipids". *Critical Reviews in Food Science and Nutrition*. 39(2):189-202.
- 52 Murray LJ, Lane AJ, Harvey IM et al. (2002). "Inverse relationship between alcohol consumption and active *Helicobacter pylori* infection: the Bristol Helicobacter project". *American Journal of Gastroenterology*, 97(11):2750-2755.
- 53 Shahidi F and Naczek M. (1995). "Food Phenolics; sources, chemistry, effects, applications". Technomic Publishing Co, Lancaster Basel. Chapter 5:128.
- 54 Suter PM. (2001). "Alcohol and mortality: if you drink, do not forget fruits and vegetables". *Nutrition Reviews*, 59(9):293-297.
- 55 Ghiselli A, Natella F, Guidi A et al. (2000). "Beer increases plasma antioxidant capacity in humans". *Journal of Nutrition and Biochemistry*, 11:76-80.
- 56 Vinson JA, Mandarano M, Hirst M et al. (2003). "Phenol antioxidant quantity and quality in foods: Beers and the effect of two types of beer on an animal model of atherosclerosis". *Journal of Food Chemistry*, 51:5528-5533.
- 57 Tagashira M, Watanabe M and Uemitsu N. (1995). "Antioxidative activity of hop bitter acids and their analogues". *Bioscience, Biotechnology, Biochemistry*, 59:740.
- 58 Pignatelli P, Pulcinelli FM, Celestini A et al. (2000). "The flavonoids quercetin and catechin synergistically inhibit platelet function by antagonizing the intracellular production of hydrogen peroxide". *American Journal of Clinical Nutrition*, 72:1150-1155.
- 59 Van der Gaag MS, Ubbink JB, Sillanauk P et al. (2000). "Effect of consumption of red wine, spirits and beer on serum homocysteine". *Lancet*, 355:1522.
- 60 Jacques PF, Boston AG, Wilson PWF et al. (2001). "Determinants of plasma total homocysteine concentration in the Framingham Offspring cohort". *American Journal of Clinical Nutrition*, 73:613-621.
- 61 Ubbink JB, Fehily AM, Pickering J et al. (1998). Homocysteine and ischaemic heart disease in the Caerphilly cohort". *Atherosclerosis*, 140(2):349-356.
- 62 Mennen LI, de Courcy GP, Guillard C-C et al. (2003). "Relation between homocysteine concentrations and the consumption of different types of alcoholic beverages: the French supplementation with antioxidant vitamins and minerals study". *American Journal of Clinical Nutrition*, 78:334-338.
- 63 De Luis DA, Fernandez N, Aller R et al. (2003). "Relation between total homocysteine levels and beer intake in patients with Diabetes Mellitus type 2". *Annals of Nutrition and Metabolism*, 47:119-123.
- 64 Mayer Jr. O, Simon J and Rosolová H. (2001). "A population study of the influence of beer consumption on folate and homocysteine concentrations". *European Journal of Clinical Nutrition*, 55(7):605-609.
- 65 Hirvonen T, Pietinen P, Virtanen M et al. (1999). "Nutrient intake and use of beverages and the risk of kidney stones among male smokers". *American Journal of Epidemiology*, 150(2):187-194.
- 66 Jugdaohsingh R, Tucker K, Qiao N et al. (2004). "Dietary silicon intake is positively associated with bone mineral density in men and postmenopausal women of the Framingham offspring cohort". *Journal of Bone and Mineral Research*, 19(2): 297-307.
- 67 Refitt DM, Oqstin N, Jugdaohsingh R et al. (2003). "Orthosilicic acid stimulates collagen type I synthesis and osteoblastic differentiation in human osteoblast-like cells in vitro". *Bone* 32:127-135.
- 68 Rico H, Gallego-Lago JL, Hernández ER et al. (2000). "Effect of Silicon supplement on osteopenia induced by ovariectomy in rats". *Calcified Tissue International*, 66(1):53-55.
- 69 Eisinger J and Clairet D. (1993). "Effects of silicon, fluoride, etidronate and magnesium on bone mineral density: a retrospective study". *Magnesium Research*, 6(3):247-249.
- 70 Sripanyakorn S, Jugdaohsingh R, Elliot H et al. (2004). "The silicon content of beer and its bioavailability in healthy volunteers". *British Journal of Nutrition*, 91(3):403-409.
- 71 Jugdaohsingh R, Anderson SHC, Tucker K et al. (2002) "Dietary silicon intake and absorption". *American Journal of Clinical Nutrition*, 75:887-893.
- 72 Bellia JR, Birchall JD and Roberts NB (1994). "Beer: a dietary source of silicon". *Lancet*, 343:235.
- 73 Food Standards Agency (2002). McCance and Widdowson's "The composition of Foods". Sixth summary edition. Cambridge: Royal Society of Chemistry.
- 74 Gerhauser C, Alt A, Heiss E et al. (2002). "Cancer chemopreventive activity of xanthohumol, a natural product derived from hop". *Molecular Cancer Therapeutics*, 1:959-969.
- 75 Nookandeh A, Frank N, Steiner F et al. (2004). "Xanthohumol metabolites in faeces of rats". *Phytochemistry*, 65(5):561-579.
- 76 Stevens JF, Taylor AW and Deizner ML. (1999). "Quantitative analysis of xanthohumol and related prenylflavonoids in hops and beer by liquid chromatography – tandem mass spectrometry". *Journal of Chromatography A*, 832:97-107.
- 77 Wannamethee SG and Shaper AG. (2003). "Alcohol, body weight, and weight gain in middle-aged men". *American Journal of Clinical Nutrition*, 77:1312-1317.
- 78 Männistö S, Uusitalo K, Roos E et al. (1997). "Alcohol beverage drinking, diet and body mass index in a cross sectional survey". *European Journal of Clinical Nutrition*, 51(5):236-332.
- 79 McCarty MF. (2000). "The insulin-sensitising activity of moderate alcohol consumption may promote leanness in women". *Medical Hypotheses*, 54:749-797.
- 80 Janssens J, Peeters L, Joossens J et al. (2002). "Obesity and alcohol consumption: Alcohol drinking habits in Belgium and body mass index". *Cerevisia*, 27(2):99-106.
- 81 Greenfield JR, Samaras K, Jenkins AB et al. (2003). "Moderate alcohol consumption, Estrogen Replacement Therapy, and physical activity are associated with increased insulin sensitivity: Is abdominal adiposity the mediator". *Diabetes Care*, 26(10):2734-2740.
- 82 Buemann B and Astrup A. (2001). "How does the body deal with energy from alcohol?". *Nutrition*, 17:638-641.
- 83 Raben A, Agerholm-Larsen L, Flint A, Holst JL and Astrup A. (2003) "Meals with similar energy densities but rich in protein, fat, carbohydrate, or alcohol have different effects on energy expenditure and substrate metabolism but not on appetite and energy intake". *American Journal of Clinical Nutrition*, 77:91-100.
- 84 Buemann B, Toubro S, Astrup A. (2002) "The effect of wine or beer versus a carbonated soft drink, served at a meal, on ad libitum energy intake". *International Journal of Obesity*, 26:1367-1372.
- 85 Dorn JM, Hovey K, Muti P et al. (2003). "Alcohol drinking patterns differentially affect central adiposity as measured by abdominal height in women and men". *Journal of Nutrition*, 133:2655-62.
- 86 Pryer JA, Nichols R, Elliot P et al. (2001). "Dietary patterns among a national random sample of British adults". *Journal of Epidemiology and Community Health*, 55:29-37.
- 87 Bobak M, Skodova Z and Marmot M. (2003). "Beer and Obesity: a cross-sectional study". *European Journal of Clinical Nutrition*, 57:1250-1253.
- 88 Nissinen A, Berrios X and Puska P (2001). "Community-based noncommunicable disease interventions: lessons from developed countries for developing ones". *Bulletin of the World Health Organisation* 79(10):963-970.



The Brewers of Europe

23-25 Rue Caroly - B - 1050 Brussels
Tel: +32 (0)2 672 23 92 - Fax: +32 (0)2 660 94 02
e-mail: info@brewersofeurope.org
www.brewersofeurope.org