



Lactose Intolerance Test

RESULT REPORT

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1 Your individual result report

Patient	John Doe	Sample No.	13.06.2016
Date of Birth	12.02.1990	Receipt of Sample	13.06.2016
Weight	146 lb	Posting of Report	13.06.2016

Dear John Doe,

Thank you for choosing the cerascreen® lactose intolerance test.

We measured the concentration of hydrogen (H₂) and methane (CH₄) in your exhaled air. The measurement of hydrogen (H₂) is - in conjunction with the existence of the corresponding symptoms - the gold standard in diagnostics for lactose intolerance. Hydrogen is formed in higher amounts when the milk sugar metabolism is disturbed. The methane concentration is also measured, as approx. 35 % of people do not deliver enough hydrogen through exhaled air. Methane is another respiratory gas, which is formed to a higher degree in case of an existing intolerance.

! A lactose intolerance is highly likely **!**
if following values are reached or exceeded:
Hydrogen from 20 ppm
Methane from 12 ppm

*(Unit ppm = parts per million)

The Cerascreen® Lactose Intolerance Test cannot and is not intended to replace a visit to the doctor.

This document has been created digitally and is valid without a signature.

If you would like a personal consultation by our nutritional experts with regard to your test results or if you have any general questions, please contact us either via mail to support@cerascreen.co.uk or by dialing +49-385-48592233.

Your Cerascreen® Team

2 Your test result

Hydrogen (H₂) expired gas analysis

Difference after 30 minutes:	8,0 ppm
Difference after 60 minutes:	0,0 ppm
Difference after 120 minutes:	4,0 ppm
Difference after 180 minutes:	6,0 ppm
Do you show at least 1 difference from 20 ppm?	No

Methane (CH₄) expired gas analysis

Difference after 30 minutes:	7,0 ppm
Difference after 60 minutes:	5,0 ppm
Difference after 120 minutes:	3,0 ppm
Difference after 180 minutes:	6,0 ppm
Do you show at least 1 difference from 12 ppm?	No

Remember:

If the organism cannot sufficiently process the ingested lactose, hydrogen and methane are formed. These two elements are exhaled and can thus be measured. Please note that the test is not suitable for children.

We have not measured any difference(= Difference is 0)?

When we measure no differences at all, a lactose intolerance is very unlikely. This means that the measured value is below the measured fasting value. The concentration of hydrogen (H₂) and methane (CH₄) in your exhaled breath has not increased after the consumption of milk sugar.

3 What is lactose intolerance?

Lactose intolerance is an intolerance to disaccharide (multiple sugar) lactose, thus milk sugar. This consists respectively of one molecule each of the monosaccharides (single sugars) glucose and galactose.

Lactose has to be split into its monosaccharides for processing in the small intestine. The enzyme lactase, which is found in the villi of the small intestine, is responsible for this function. Only the monosaccharides can be metabolized by the sodium-dependent SGLT1-transporter in the various sections of the intestine. Depending on the residual activity of the enzyme lactase, the degree of severity of lactose intolerance can differ greatly and the symptoms are correspondingly distinctive. If the milk sugar is not or only partly broken down by the digestive enzyme lactase and if larger amounts of milk sugar reach the lower sections of the intestine populated by bacteria, the lactose becomes nutrition for the bacteria. Large amounts of gases and fatty acids are thus produced, which leads to complaints (see chapter 5).



Lactose intolerance should not be confused with a milk protein allergy. In contrast to an allergy, in which the immune system is involved and the corresponding antibodies are formed, lactose intolerance arises from a deficit or insufficiency of enzyme production without the involvement of the immune system.

There is a clear North-South divide in Europe in this respect.

4 Which forms of lactose intolerance exist?

Primary lactase deficiency

Two forms are differentiated here depending on the time of manifestation: Congenital or absolute lactase deficiency (no formation of lactase, genetic metabolic disorder, very rare) and physiological lactase deficiency, which begins post-weaning. Lactase activity decreases with age. This form is globally widespread.

Secondary lactase deficiency

This is a lactose intolerance which comes as a side effect of an underlying disease. The reason for the lactase deficiency is damage to the small intestine mucous membrane. This can for example be the case due to coeliac disease or the inflammatory bowel diseases like Crohn's disease and colitis ulcerosa. Therefore, this

form can begin at any age. If the underlying disease has been healed or the symptoms have been stilled through adequate diet, there is a good chance that the lactose intolerance will also regress.

5 Which symptoms can occur?

If the milk sugar is not or only insufficiently broken down by the digestive enzyme lactase in the small intestine, larger amounts of the uncleaved lactose reach the lower sections of the intestine populated by bacteria and gets fermented there. Large amounts of hydrogen, methane, carbon dioxide and short-chain fatty acids are subsequently produced, which leads to complaints.

It is not the hydrogen or the methane that are causing the complaints but the formation of carbon dioxide and fats.

The typical symptoms arise from gas formation and fats. The large amount of carbon dioxide causes flatulence. This can be removed via the large intestine. In contrast, in the small intestine, the gas penetrates through the intestinal wall, gets into the blood and is then exhaled through the lungs. This procedure feels extremely unpleasant and can also cause bad breath.

The fatty acids attract water to the intestine, which causes a dilution of the stool and leads to diarrhoea. Bowel sounds are caused by an increased bowel movement. The change in stool consistency can be explained by the percentage increase of fatty acids, so-called fatty stools, or the increased inclusion of gases.

Other symptoms are possible in connection with lactose intolerance. These include heartburns and fatigue as well as migraine attacks.

6 What treatment options are there?

Treatment of the underlying disease(s) in the case of secondary lactase deficiency

If there is an underlying disease such as e.g. coeliac disease or other bowel diseases impairing the intestinal mucosa and which could have for consequence a secondary lactose intolerance, the first choice is treating this disease to lay the foundation for a possible recovery.

Change of diet (see chapter 7)

Diet is changed in three steps. The first step takes strain off the gastrointestinal tract by leaving out lactose and eating lactose-free foods. In the next two steps, the remaining activity of the lactase and as such the individual tolerance threshold are verified through tests and finally the permanent diet is determined.

Food supplements with the enzyme lactase

After having successfully adapted your diet to your level of enzyme activity, you can also take the enzyme lactase (beta-galactosidase) in tablet or capsule form. An exact dosage is extremely important here, as the body reduces the remaining enzyme activity when the enzyme becomes available in sufficient quantities by external supply. Therefore, there are different doses or varying degrees of FCC (Food Chemical Codex, the amount of the so-called purity and identity of food ingredients) for lactase.



Theoretically, 1g of lactose is broken down by 200 FCC of lactase. As this is determined under laboratory conditions, other factors, such as e.g. the food composition and the time of intake, are considered.

Lactase in capsule form requires, possibly, less FCC than lactase in tablet form, as capsules are resistant against gastric juices and are not reduced by the gastric acids. In case of a known individual tolerance threshold, the dosage can be determined relatively quickly based on the different foods.

7 Your path towards a poor in lactose or lactose-free diet

What does lactose-free mean?

According to the position paper of the Food Chemistry Society within the German Chemical Society (GDCh), the definitions are:

- “poor in lactose” means a lactose content of 1g / 100 grams or milliliters or less of the food or ready-to-eat product
- “strictly low in lactose” means a lactose content of 100 mg / 100 grams or milliliters

- “lactose-free” means a content of lactose and / or lactose decomposition products gained through enzymatic cleavage or similar processes of 10 mg / 100 grams or milliliters or less

In most cases, a diet poor in lactose should be sufficient. This has to be determined individually according to the residual enzyme activity.

Changing your diet should take place in three phases:

1st phase - Diet strictly low in lactose

For a maximum of two weeks, a diet strictly low in lactose helps to omit the sugar alcohols, which also often trigger complaints (sorbitol, xylitol, maltitol, mannitol and isomalt). The aim is to eliminate the complaints to as great a degree as possible. A

light normal diet is recommended as basic diet.

2nd phase - Test phase

In this phase, food containing lactose, including milk and milk products, is reintroduced gradually. In this way, the individual tolerance to lactose can be determined.

3rd phase - Permanent diet

The third and final phase is the determination of the permanent diet. Particular attention should be paid to the coverage of the daily nutritional requirements.

The following is a summary of suitable, doubtful and unsuitable foods in case of a lactose intolerance.

If you have very little lactase production, you have to be careful with even the smallest amount of lactose and as such adhere to a lactose-free diet. Most of those affected do not have to adhere to such a strict diet, as the lactase production is generally not that low.

Lactose can be found in the following foods, although this may not be apparent at first glance:

- Canned vegetables
- Bakery products
- Cereal mixtures
- Sausage products, also ham
- Canned fish
- Ready meals
- Margarine
- Salad dressing, mayonnaise, pesto
- Spreads
- Soft liquorice products
- Spice mixes
- Sweetener and wheat germ tablets
- Flavours
- Thickeners, binding agents

The following are lactose and milk-free foods:

- Fruit juices, mineral water, tea, coffee
- Fresh fruit and vegetables
- Nuts
- Legumes
- Potatoes, pasta, rice
- Cereal, cereal flakes
- lactose-free milk and milk products
- Meat/fish (unprocessed)
- Chicken eggs
- Honey, jams
- Fruit gum without yoghurt
- Herbs, spices

Food with a high lactose content:

Foods with a high lactose content, which cannot normally be eaten in case of lactose intolerance, are contained in the following list. An exception is when the lactose intolerance is extremely slight with sufficient lactase activity or when taking enzyme replacement preparations. The German nutrition consulting and information network has published this list. It should be noted that the foods listed have different levels of lactose content:

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Food group ☺	Food
Milk / milk products	milk, cheese, dried milk, pudding, mixed drinks, cocoa drinks, desserts, coffee whitener, condensed milk, cream, sour milk, kefir, yogurt, curdled milk, whey, curd, cottage cheese, cheese spreads, processed cheese
Bread / bakery products	bread and cake mixes, milk rolls, waffles, cake, biscuits, crispbread, crackers
Ready meals	pizza, frozen ready meals, tinned food, frozen prepared meals, e.g.: meat or vegetable meals
Confectionary	ice-cream, chocolate, toffees and cream toffees, sweet bars, nougat, nut-nougat-cream, pralines
Meat / Sausage products	sausages, liver sausage, low-fat sausage products, canned sausage meat
Instant products	instant soups, instant sauces, instant creams, mashed potato powder, dumpling flour, patty mixtures
Ready-made sauces	gourmet sauces, barbecue sauces, salad sauces, mayonnaise
other products	cereal mixtures, margarine products, spreads

8 How to ensure the success of a lactose-free diet?

Normally, the nutrient supply is ensured if you eat a lactose-free or a low in lactose diet. Calcium, however, can be regarded as a critical nutrient, as milk and milk products are the main source of calcium in our diet and at our latitude.



The following products can cover the daily requirement of calcium: lactose-free milk and milk products, certain types of cheese that are low in lactose (e.g. several hard or sliced cheese sorts), other lactose-free products (soy products, oat and rice drinks with added calcium), vegetables that are rich in calcium (e.g. broccoli, fennel, kale and leek) as well as drinks containing calcium or with added calcium (mineral water with calcium).

If other food intolerances and food allergies exist, best consult an experienced nutritionist to attain a nutritious and healthy diet without risking poor nutrition. Please also feel free to contact our nutritionists.

Basically, a varied diet and a healthy lifestyle support the entire process.

9 How do I recognize lactose-free products?

Regulation (EU) No.1169/2011 on the provision of food information to customers, in force since 13 December 2014, provides for obligatory labelling of certain substances which trigger allergies or intolerances (among others, milk and milk products including lactose). These must be clearly indicated, for instance via coloured labelling or in bold text. This ensures that you can clearly tell even from the list of ingredients on the package whether a product is lactose-free or not.

The German Coeliac Society (DZG) yearly issues a comprehensive positive list of lactose-free and gluten-free products in the sectors food, medicines, food supplements, medical and dental products, oral hygiene products as well as cosmetics. Mostly, such a rigid interpretation of the tolerance won't be fulfilled which makes final information necessary.

Nowadays, a number of manufacturers declare their products as lactose-free, some in the form of a seal, others clearly visible in text form.

10 Practical Tips

Please remember that milk from other animals also contains lactose: Goat's milk 4.4%, sheep's milk 4.2% and mare's milk 6.2%.

The tolerance of milk products can be improved if they are divided up over the day and eaten at mealtimes.

Do not omit cheese from your diet because of lactose intolerance due to its high level of calcium. As a general rule: the older the cheese, the less lactose it contains.

Curdled milk products such as kefir or yogurt may be better tolerated, as they contain lactic acid bacteria, which break down lactose. Just try it out.

Product with the labelling "can contain traces of lactose" can normally be consumed, as the lactose content is very low.

To improve your calcium supply, eat more of the calcium rich vegetables, such as kale, leaf spinach and broccoli. Also use the water that the vegetables have been cooked in.

Sugar alcohols such as sorbitol, mannitol and xylitol can have a laxative effect when supplied in larger amounts and can cause flatulence and diarrhoea. These should therefore be avoided.

Medication may also contain lactose. The lactose content is, however, very low and usually does not cause any complaints. If necessary, there are lactose-free alternatives available. Consult your doctor or pharmacist before changing your medication.

Ensure a sufficient liquid supply by drinking roughly 1.5 litres per day. In case of diarrhoea, the amount of liquid required is higher than 1.5 litres. Choose drinking and mineral water, unsweetened fruit or herbal teas and diluted fruit juice (3 parts water, 1 part juice). If you choose mineral water, it should be calcium enriched.

You can use alternatives to milk and milk products - also when cooking and baking - in the form of special or natural lactose-free products such as rice milk, oat milk or soya milk.

Psychological strains such as stress or anger can impair the intestinal functions. Therefore, take your time when eating.

To avoid dietary errors and the ensuing consequences, seek counselling from experienced nutritional experts when changing your eating habits.

Last but not least: Bear in mind the list of ingredients! It can change unnoticed at any time.

11 Reference list

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