

Minerals for Meatless Meat

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hrough human nutrition, the human organism has adapted its physiology to the omnivorous lifestyle in the course of evolution.

For example, human teeth are extremely well-suited to break up meat with both the incisors as well as crushing it with the molars. In addition, the human intestine has adapted to the regular consumption of meat. Abstaining from animal products in the nutrition has recently been enjoying a certain amount of popularity. However, this practice has deep roots in the cultural history of human beings. Although humans are omnivores, some cultures have deliberately avoided eating other living creatures or their products. This can be for many reasons such as religion, ideology or health. Recently, the environmental protection is also playing a role in abstaining meat eating. Environmental damage caused by meat consumption is largely due to intensive



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Magnesium Citrate Malate for Food Supplements

According to the Commission Regulation (EU) 2021/418 amending Directive 2002/46/EC for food supplements our new Magnesium Salt is permitted for the fortification of food supplements in Europe.

Magnesium Citrate Malate by Dr. Paul Lohmann® is a fully reacted Mineral and a new and innovative ingredient for food supplements. The combination of Magnesium with two organic acids, citric acid and malic acid, leads to a Mineral Salt with excellent solubility. Citric acid and malic acid are part of the human metabolism and therefore easy to metabolize.

The free-flowing and non-hygroscopic powder is clear soluble and stable in solution. The Magnesium content is similar to other organic Magnesium Salts, but the performance in liquid application forms is much better. Comparable products are not stable in solution over storage time or even insoluble. The original taste is more pleasant compared to other Magnesium sources and can be easily masked. Magnesium Citrate Malate is especially designed by Dr. Paul Lohmann® for the use in high concentrated liquid ready-to-drink food supplements.



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animal husbandry.

There are many different types of vegetarianism. In addition to the well-known Vegetarians and Vegans, there are also Flexitarians, Ovo-Lacto Vegetarians, Ovo Vegetarians, Lacto Vegetarians and Pescetarians. They differ in the extent to which the adherents abstain from animal products.

Various reasons can lead to the avoidance of meat products. Some people do not want to eat meat for religious reasons, other do not like the taste of meat. Others want to consume food with a better carbon footprint and again other people cannot eat meat products on health reasons. The housing conditions of farm animals is another reason for many people to live a vegetarian lifestyle. Many people try to avoid meat in order to protect the animals and thus to set an example.

A majority of animals for slaughter are kept, transported and slaughtered under unworthy conditions. In current times such as the corona crisis, the meat industry is strongly criticized. The working conditions are often bad in this industry. In addition to the general occupational safety and health standards, they must improve the climatic conditions in slaughterhouses. As a result of this situation, many meat eaters have now decided to switch to meat substitutes.

Iron and Zinc are key

It is easy to buy meatless meat instead of real meat. But many consumers do not consider, that animal products and especially meat contain various Minerals, which are difficult to obtain from a purely plant-based nutrition. For omnivores, Iron is primarily taken in by the body in the form of easily absorbable Fe^{2+} from meat. Alternatively, Iron

can also be absorbed by wheat germs, for example, as they also contain high amounts of Iron. This is Iron in the form of Fe^{3+} , which is more difficult for the body to absorb in contrast to Iron from meat products. Iron is an important part of the human organism. A balanced Iron level contributes to the energy-yielding metabolism, reduces tiredness and it supports the process of cell division. The main function of Iron is the support of the oxygen transport in the body, and the formation of red blood cells.

The trace element Zinc also plays a major role in the human body. It contributes to the maintenance of normal hair, skin, and bones. In addition, the entire metabolism, the immune system and also the fertility of humans benefit from this Mineral. In fact, cognitive functions and vision are Zinc-dependent.

The daily requirements of Iron and Zinc are particularly difficult to meet with purely plant-based foods.

Options for a healthy vegetarian and vegan lifestyle

To fulfil the requirements of a vegetarian or vegan lifestyle, special meat substitutes are designed. Meat replacements resemble to real meat and meat products in texture, haptic, taste and outer appearance. The products are based on non-meat protein, for example soy protein, gluten and protein from fungus. However, the mineral content of meat substitutes is often lower in comparison to real meat and meat products. To compensate mineral deficiencies caused by the vegetarian and vegan lifestyle, the regular intake of dietary supplements can ensure a sufficient and

complete supply of Minerals even while abstaining from all animal products. Another option is the use of fortified food products containing sufficient amounts of Minerals, especially popular vegetarian and vegan meatless meat products can secure an adequate nutrient supply. Soy-based meat substitute products as well as other plant-based proteins are highly processed products that are well-suited for enrichment with Minerals during the production process. They represent a varied matrix that can be refined in nearly any manner and can undergo a nutritional upgrade. In particular, enrichment with Iron and Zinc can compensate for the deficiencies in a vegetarian and vegan lifestyle.

To compensate the lack of Iron and Zinc the following products by Dr. Paul Lohmann® can be used for the fortification of meat replacements.

Element	Mineral Salts
Iron	Ferric Pyrophosphate (fine or ultrafine)
	Ferrous Fumarate
	Ferrous Gluconate
	Ferrous Citrate
	Ferrous Lactate
Zinc	Zinc Citrate (fine or micronized)
	Zinc Gluconate

Dr. Paul Lohmann® provides comprehensive support in the development of fortified products. As a specialized manufacturer of high-quality Mineral Salts the product portfolio includes over 400 different Mineral Salts. The company works together with the client in close cooperation starting from the selection of the Minerals, the development of manufacturing processes to the question of health-related labeling.



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How to find the best Mineral Salt

The choice to the anionic part of a Mineral Salt is of particular importance. Beside physical and chemical properties like solubility, pH-value and taste, anions have also an influence on the bioavailability and the compatibility. Organic acids promote the absorption of certain cations, like Magnesium, Calcium, and Iron. Citrate, Malate and Fumarate are part of the citric acid cycle within the human metabolic pathway and are therefore easy to digest. Fully reacted Mineral Salts from Amino Acids like Bisglycinate are known for an excellent bioavailability and are well tolerated.

Mineral Salts of Dr. Paul Lohmann® are especially designed for the use in food supplements. They fulfill the purity parameters for ready to use food supplements already in the raw material state. These quality parameters were decreed by the European Commission to ensure the constantly high quality and purity of food

supplements. Different techniques of particle size engineering like micronization, granulation or microencapsulation is a strength of Dr. Paul Lohmann®. Tailor-made product developments and product adaptations are carried out in close collaboration with the customers.



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german manufacturer
 since 1886

**Magnesium
 Innovation**

Magnesium Citrate Malate

- ◆ Permitted for food supplements in Europe since 2021
- ◆ High and clear solubility
- ◆ Stable in high concentrated solutions
- ◆ Pleasant taste



High value mineral salts