

BORON COMPOUNDS: CHALLENGES AND APPLICATIONS IN FOOD INDUSTRY

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Abstract: Boron-based compounds have various applications in the food industry, for instance boric acid and borax are used as food additives to improve the texture and stability of foods, meanwhile calcium fructoborate is an essential nutraceutical used in the development of beverages, dietary supplements and functional foods such as protein foods and baked goods.

• Introduction

Boron-based compounds have many industrial applications, such as: the chemical industry, the pharmaceutical industry and the food industry.

The use and marketing of foods with boron-based compounds is regulated by the Food and Drug Administration (FDA) in the United States and the European Food Safety Authority (EFSA) in Europe.

• Boron food sources

Foods	Boron content (mg B/100 g)	Health benefits
Avocado	1.07	a great source of healthy fats and dietary fibers
Peaches	0.80	a great source of antioxidants
Prune juice	1.43	a good functioning of digestive and bone system
Raisins	0.95	a good source of dietary fibers

• Applications of boron compounds in food industry

Boron-based compounds	Applications in food industry
Boric acid (E 284) and sodium tetraborate (borax) (E 285)	Certain nutritional applications and food supplements
Boric acid, disodium octaborate tetrahydrate and sodium pentaborate	Design of new biodegradable antimicrobial packaging films from gelatin
Hexagonal boron nitride with a similar structure as graphite	Improvement of the strength and ductility of foods packaging films
Carbon quantum dots (CQDs) based on glucose and boron	Development of active packaging for food films as functional fillers
Chemical synthesized calcium fructoborate	A novel food (NF): 2,9% boron, 4,7% calcium and 84,2% fructose

• Conclusions

So, it is mandatory to follow the regulations established by food agencies and to use boron-based compounds only in safe and the approved amounts.