

Antinutrients and strategies to reduce their content in food

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1. Objectives

- Getting to know the main antinutrients that affect human health, their effects, both negative and positive, and the mechanism of action that provokes them.
- Getting to know the need to reduce the content of antinutrients in food, especially for certain population groups, and the main methods to achieve it.

2. Results

Table 1. Main harmful effects of each antinutrient.

Phytic acid	Mineral, protein and carbohydrate chelator
Lectins	Reduction of nutrient absorption and toxic effects (vomits, nausea, diarrhea)
Oxalic acid	Mineral chelator, stone formation and other kidney complications
Goitrogens	Alteration of thyroid function leading to thyroid diseases
Cyanogenic glycosides	Formation of hydrogen cyanide, toxic in high quantities
Saponins	Mineral chelator, reduction of nutrient absorption by inhibition of enzymes
Thiaminases	Thiamine degradation
Protease inhibitors	Inhibition of protein-degrading enzymes, reduction of protein absorption
α -Amylase inhibitors	Inhibition of carbohydrate-degrading enzymes, reduction of carbohydrate absorption
Tannins	Mineral, protein and carbohydrate chelator
Biogenic amines	Variety of toxic effects



Table 2. Antinutrients reduced by each process.

		Phytic acid	Lectins	Oxalic acid	Goitrogens	C. glycosides	Saponins	Thiaminases	Protease inhibitors	α -Amylase inhibitors	Tannins	Biogenic amines	
Traditional processes	Thermal processing	X	X	X	X	X	X	X	X	X	X		
	Dehulling	X		X					X	X	X		
	Soaking (leaching)			X		X	X				X		
	Drying			X		X	X				X		
	Fermentation	X	X	X	X	X			X		X	X	
	Germination	X	X						X		X	X	
Technological processes	Autoclave	X	X	X	X	X	X	X	X	X	X		
	Irradiation	X	X						X				
	Enzymic processing	X									X	X	
	Starter cultures											X	
	Additives and preservatives											X	
	Extrusion cooking	X	X	X	X	X	X	X	X	X		X	
	Genetic engineering	X	X	X	X	X	X	X	X		X	X	X
	Ionic force and UF	X											

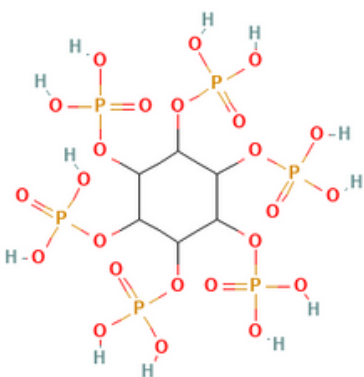


Figure 1. Chemical structure of phytic acid. Source: Pubchem

3. Conclusions

- The application of the methods described is necessary to ensure optimal and efficient nutrition and avoid harm, especially to population risk groups.
- Tests and experiments must continue to be carried out in order to gain a greater insight into the actual effect of consuming food rich in certain antinutrients.
- Tests and experiments must continue to be carried out in order to get to know the actual effect of each method on each particular food.