

- Chen Y-T, et al. Amelioration of proximal renal tubular dysfunction in type I glycogen storage disease with dietary therapy. *N Engl J Med* 1990; **323**: 590-5.
- Rake JP, et al. Guidelines for management of glycogen storage disease type I - European study on glycogen storage disease type I (ESGSD I). *Eur J Pediatr* 2002; **161** (suppl): S112-S119.

Preparations

BP 2008: Compound Zinc Paste; Dithranol Paste; Talc Dusting Powder; **USP 31:** Absorbable Dusting Powder; Topical Starch.

Proprietary Preparations (details are given in Part 3)

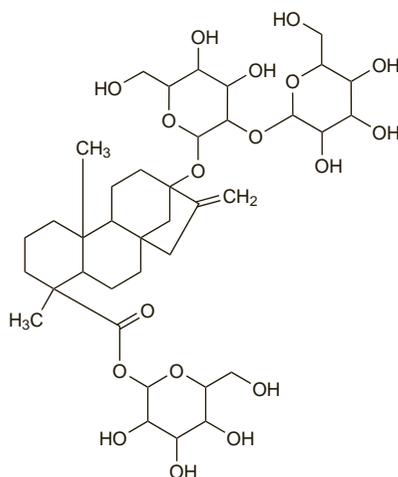
Austral: Karicare Food Thickener; **Mex:** Panaline†; **NZ:** Karicare Food Thickener.

Multi-ingredient: **Austral:** Nuclolex; **ZSC:** **Braz:** Talco Allivio†; **Fr:** Magic Mix Poudre du Marcheur; **India:** Feel Chill; **Israel:** Baby Paste; **Ital:** Lenipasta†; **NZ:** Lamisil Odor Eze, Nuclolex†; **Port:** Cuidaderma; **S.Afr:** SB Universal Ointment; **UK:** Herbal Ointment; Psorasolv; Skin Clear; **USA:** Balmex Baby; Desitin with Zinc Oxide; Diaparene Corn Starch; Mexsana; Norform†; Paladin; Yeast-X†.

Stevioside

Esteviósido; Eupatorin; Rebaudin; Stevin; Steviosin.

$C_{38}H_{60}O_{18}$ = 804.9.
CAS — 57817-89-7.



Pharmacopoeias. In *Chin*.

Profile

Stevioside is a glycoside extracted from the leaves of yerba dulce, *Stevia rebaudiana* (Compositae). It has about 300 times the sweetness of sucrose and has been used as a sweetening agent in foods. Both the related glycoside rebaudioside A (rebiana), and an extract of the leaves of *Stevia rebaudiana* which contains these and other glycosides, have been used similarly. The use of stevioside or stevia leaves as a sweetener has been banned in some countries due to concerns about genotoxicity and possible effects on fertility.

References.

- Geuns JM. Stevioside. *Phytochemistry* 2003; **64**: 913-21.

Hypertension. The antihypertensive action of stevioside has been investigated. An oral dose of 250 mg three times daily was found to lower blood pressure in patients with mild to moderate hypertension,¹ and 500 mg three times daily decreased blood pressure and the incidence of left ventricular hypertrophy in patients with mild hypertension.²

- Chan P, et al. A double-blind placebo-controlled study of the effectiveness and tolerability of oral stevioside in human hypertension. *Br J Clin Pharmacol* 2000; **50**: 215-20.
- Hsieh M-H, et al. Efficacy and tolerability of oral stevioside in patients with mild essential hypertension: a two-year, randomized, placebo-controlled study. *Clin Ther* 2003; **25**: 2797-2808.

Preparations

Proprietary Preparations (details are given in Part 3)

Arg: Edulsan; Steviadulin.

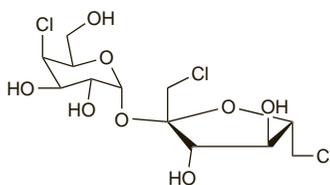
Multi-ingredient: **Chile:** Nature Complex Reduct-Te.

Sucralose (BAN)

Sucralosa; Sucralosum; TGS; Trichlorogalactosucrose. 1,6-Dichloro-1,6-dideoxy-β-D-fructofuranosyl 4-chloro-4-deoxy-α-D-galactopyranoside.

$C_{12}H_{19}Cl_3O_8$ = 397.6.
CAS — 56038-13-2.

The symbol † denotes a preparation no longer actively marketed



Pharmacopoeias. In *USNF*.

USNF 26 (Sucralose). A white to off-white, crystalline powder. Freely soluble in water, in alcohol, and in methyl alcohol; slightly soluble in ethyl acetate. Store in a cool, dry place at a temperature not exceeding 21°.

Profile

Sucralose is used as a sweetening agent in foods, beverages, and pharmaceuticals. It has between about 300 and 1000 times the sweetening power of sucrose and is stable to heat. It has no food value and is noncarcinogenic.

References.

- Anonymous. Sucralose—a new artificial sweetener. *Med Lett Drugs Ther* 1998; **40**: 67-8.
- Roberts A, et al. Sucralose metabolism and pharmacokinetics in man. *Food Chem Toxicol* 2000; **38** (suppl): S31-S41.

Preparations

Proprietary Preparations (details are given in Part 3)

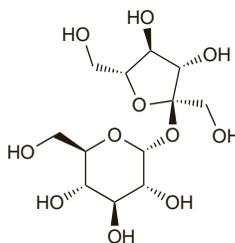
Chile: Sugafor

Sucrose

Azúcar; Cane Sugar; Refined Sugar; Sacarosa; Saccharose; Saccharosum; Saccharum; Sacharosa; Sacharozza; Sacharozé; Sackaros; Sakkaroosi; Sucre; Sucrosum; Szacharóz; Zucker. β-D-Fructofuranosyl-α-D-glucopyranoside.

$C_{12}H_{22}O_{11}$ = 342.3.

CAS — 57-50-1.



Description. Sucrose is obtained from sugar-cane, *Saccharum officinarum* (Gramineae), sugar-beet, *Beta vulgaris* (Chenopodiaceae), and other sources.

Pharmacopoeias. In *Chin*, *Eur*. (see p.vii), *Jpn*, and *Viet*. Also in *USNF*.

Eur: also contains Compressible Sugar.

Eur: also includes Sugar Spheres.

USNF also includes Compressible Sugar, Confectioner's Sugar, and Sugar Spheres.

Ph. Eur. 6.2 (Sucrose). A white or almost white, crystalline powder or shiny, colourless or white or almost white crystals. Very soluble in water; slightly soluble in alcohol; practically insoluble in dehydrated alcohol.

USNF 26 (Sucrose). A sugar obtained from *Saccharum officinarum* (Gramineae), *Beta vulgaris* (Chenopodiaceae), and other sources. White, crystalline powder or lustrous, dry, colourless or white crystals. Soluble 1 in 0.5 of water, 1 in 0.2 of boiling water, and 1 in 170 of alcohol; practically insoluble in dehydrated alcohol.

Incompatibility. Sucrose may be contaminated by traces of heavy metals or sulfites and this can lead to incompatibility with other ingredients when it is used as a pharmaceutical excipient. Syrup preserved with hydroxybenzoates has been reported to be incompatible with a range of compounds.

Adverse Effects and Precautions

Sucrose consumption increases the incidence of dental caries.

Sucrose use should be avoided in patients with the glucose-galactose malabsorption syndrome, fructose intolerance, or sucrase-isomaltase deficiency. The intake of sucrose from dietary and other sources must be controlled in patients with diabetes mellitus.

Dietary sugar. The Panel on Dietary Sugars reviewed the evidence relating to sugars in the diet and the health of the population in the UK.¹

No evidence was found that the consumption of most sugars naturally incorporated into the cellular structure of foods (intrinsic sugars) represented a threat to health and consideration was therefore mainly directed towards the dietary use of sugars not so incorporated (extrinsic sugars), of which sucrose was the principal non-milk extrinsic sugar.

There was extensive evidence suggesting that sugars were the most important dietary factor in the cause of dental caries and it was recommended that consumption of non-milk extrinsic sugars should be decreased.

It was considered that dietary sugars may contribute to the development of obesity, a condition which plays an important part in the aetiology of a number of diseases. For the majority of the population, who had normal plasma lipids and normal glucose tolerance, the consumption of sugars within the present range carried no special metabolic risks but those persons consuming more than about 200 g daily should replace the excess with starch. It was, however, recommended that those with special medical problems such as diabetes or hypertriglyceridaemia should restrict non-milk extrinsic sugar to less than about 20 to 50 g daily unless otherwise instructed by their own physician or dietician. It was also concluded that current consumption of sugars, particularly sucrose, played no direct causal role in the development of cardiovascular (atherosclerotic coronary, peripheral, or cerebral vascular) disease, essential hypertension, or diabetes mellitus, and also had no significant specific effects on behaviour or psychological function. Although links between sucrose intake and certain other diseases (such as colorectal cancer, renal and biliary calculi, and Crohn's disease) had been proposed it was not felt that the evidence was adequate to justify any general dietary recommendations.

The conclusions of a joint FAO/WHO consultation on carbohydrates in human nutrition² were broadly in agreement with the above. However, they noted that the terms intrinsic and extrinsic sugars had not gained wide acceptance, either in the UK or other countries in the world, and they recommended against the use of these terms.

- DoH. Dietary sugars and human disease: report of the panel on dietary sugars of the committee on medical aspects of food policy. *Report on health and social subjects 37*. London: HMSO, 1989.
- FAO/WHO. *Carbohydrates in human nutrition: report of a joint FAO/WHO expert consultation*. FAO Food and Nutrition 66. Rome: Food and Agriculture Organization of the United Nations, 1998.

Effects on the kidneys. Acute renal failure with severe hyponatraemia has followed the use of granulated sugar to treat an infected pneumonectomy wound cavity.¹ It was noted that intravenous sucrose had long been known to be nephrotoxic in both animal models and man and that mild renal insufficiency before sucrose intoxication might have contributed to the nephrosis. Others, however, considered that the nephrotoxicity might have been caused by gentamicin, a solution of which had been used to irrigate the cavity before packing the wound.² Intravenous immunoglobulin preparations containing sucrose (as a stabilising agent) have also caused acute renal failure.^{3,4}

- Debure A, et al. Acute renal failure after use of granulated sugar in deep infected wound. *Lancet* 1987; **i**: 1034-5.
- Archer H, et al. Toxicity of topical sugar. *Lancet* 1987; **i**: 1485-6.
- Ahsan N, et al. Intravenous immunoglobulin-induced osmotic nephrosis. *Arch Intern Med* 1994; **154**: 1985-7.
- Zhang R, Szerlip HM. Reemergence of sucrose nephropathy: acute renal failure caused by high-dose intravenous immune globulin therapy. *South Med J* 2000; **93**: 901-4.

Pharmacokinetics

Sucrose is hydrolysed in the small intestine by the enzyme sucrase to glucose and fructose, which are then absorbed. Sucrose is excreted unchanged in the urine when given intravenously.

Uses and Administration

Sucrose, a disaccharide, is used as a sweetening agent. It is commonly used as household sugar. If the sweetness of sucrose is taken as 100, fructose has a value of about 173, glucose 74, maltose 32, galactose 32, and lactose 16.

Sucrose is used as a tablet excipient and lozenge basis, and as a suspending and viscosity-increasing agent. Syrups prepared from concentrated solutions of sucrose form the basis of many linctuses. Treacle (molasses), a byproduct of sugar production that contains sucrose and minerals, has also been used.

Sucrose 30% eye drops have been used as a hypertonic agent for clearing corneal oedema.

Cough. Sucrose syrups are used as demulcents in linctuses used for treating cough (p.1547).