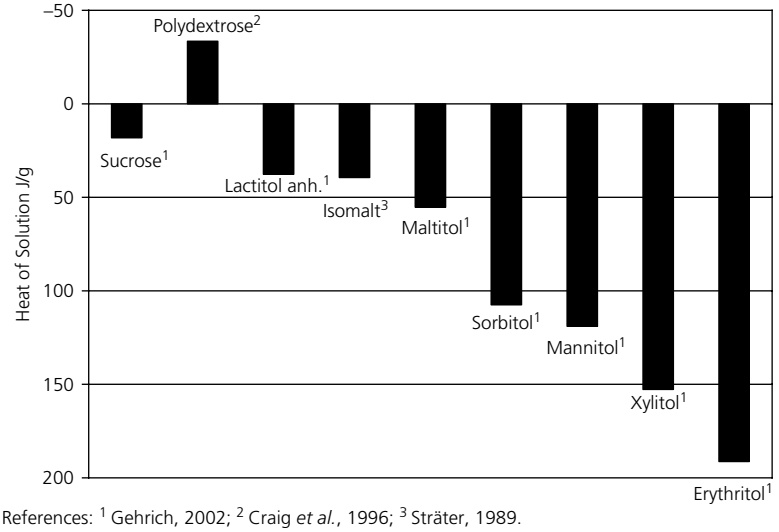

References: [1] Gehrich, 2002; [2] Craig *et al.*, 1996; [3] Sträter, 1989.

Figure 4.2 Heat of solution of bulk sweeteners and sugars.

the various polyols or fructose can be balanced by combining these sweeteners with polydextrose or inulin.

4.11 Solubilities and melting points of sugars and bulk sweeteners

The solubility and melting point of a bulk sweetener are very important from a processing point of view. High solubilities or low melting points can result in gritty agglomerates at higher conching temperatures. Table 4.11 lists the saturation concentrations of sucrose and the common bulk sweeteners, whilst Table 4.12 gives their melting points.

4.12 Maximum conching temperatures of chocolate masses with different bulk sweeteners

In addition to solubility and melting point, the presence or absence of water of crystallisation determines the maximum temperature at which a chocolate containing a bulk sweetener can be conched. At higher temperatures this water can be released, risking the formation of gritty agglomerates and producing unsuitable chocolate flow properties. Although the amorphous polydextrose cannot be completely dried, it can be used at temperatures of up to 80 °C (176 °F) when combined with anhydrous lactitol (Parsons and Fairs, 1998). Table 4.13 lists the maximum conching temperatures for chocolates masses made with different bulk sweeteners.

Table 4.11 Saturation at 20 °C (68 °F).

Sugar/sweetener	Saturation (g/100 g solution)
Sucrose	66.7
Fructose	78.9
Tagatose	58.0
Glucose	47.2
Glucose syrup	Non-crystallising
Lactose	16.0
Sorbitol	68.7
Xylitol	62.8
Maltitol	62.3
Maltitol syrup	Non-crystallising
Lactitol	56.5
Isomaltulose	29.0
Isomalt	24.5
Mannitol	14.5
Erythritol	37.0
Polydextrose	Non-crystallising

Table 4.12 Melting points of sugars and bulk sweeteners.

Sugar/sweetener	Melting point	
	°C	°F
Lactose (monohydrate)	>200	>392
Sucrose	185–186	365–367
Mannitol	165–169	329–336
Lactitol (anhydrous)	149–152	300–306
Dextrose (anhydrous)	146	295
Isomalt	145–150	293–302
Maltitol	147	297
Tagatose	133–137	271–279
Erythritol	126	259
Polydextrose	125–135	257–275
Isomaltulose	120–128	243–259
Fructose	102–105	215–221
Lactitol (monohydrate)	94–100	201–212
Sorbitol	92–96	198–205
Xylitol	92–96	198–205
Dextrose (monohydrate)	83	181