

Currency Unit, currently about US\$ 1.3.) Of this, some 2–5 million ecu is from seaweed meal, seaweed extracts and seaweed composts, the remainder being from the production of phycocolloids.

The sulphated galactans from red algae principally serve the same industrial purposes as the alginates. They may be separated into two important groups: agars, which have a relatively low sulphate content and are good gelling agents with water, and the carrageenans which do not form gels with water but need the addition of salts to do so.

AGAR

The manufacture of a relatively pure agar started in the Far East in the latter half of the 17th century (Booth 1979). The preferred genera for extraction of agar and agarose are *Gelidium*, *Gelidiella*, *Gracilaria*, *Acanthopeltis* and *Pterocladia*, and *Ahnfeltia plicata* in the USSR. European production is summarized in Table 2. The neutral fraction of agar, lacking sulphate and other charged groups, is called agarose (Chapter 8). Currently, there is a shortage of both agar and agarose on the world market, resulting in increasing prices. Standard food agar was priced at US\$ 13 kg⁻¹ in 1985, and the retail price of bacteriological agar was about US\$ 25 kg⁻¹ (Moss & Doty 1987), although agarose may fetch US\$ 500 kg⁻¹ or more.

CARRAGEENANS

Contrary to popular belief, Mitchell and Guiry (1983) found no evidence that the name carrageen (from which carrageenan was derived) came from a particular placename in Ireland. The first mention of its use in an industrial context was as a fining agent in a Bavarian brewery in 1842 (Booth 1979). The main sources of carrageenans are species of *Eucheuma* cultivated in the Philippines, a mixture of *Chondrus crispus* and *Furcellaria lumbricalis* harvested in Canada, and *Chondrus crispus*, *Mastocarpus stellatus* and *Gigartina* spp. harvested in France, Spain and Portugal (Stanley 1987; Moss & Doty 1987; Chapter 1). Furcellaran, a carrageenan extracted from *F. lumbricalis*, of which 4000 t are harvested off Denmark (Rye 1985), resembles κ -carrageenan, but has a lower sulphate content. Because of their price, availability and improved properties, carrageenans from alkali-modified extracts of *Eucheuma* and *Chondrus* have largely taken over the canned-food market earlier dominated by agar (Booth 1975; Witt 1985). Prices of carrageenans are currently in the range US\$ 5–10 kg⁻¹ (Moss & Doty 1987).

ALGINATE

In 1881, E.C.C. Stanford was issued a British patent for the manufacture of alginates, and he also proposed many applications for this most recent of the