

eaten raw or parched by Indians. They may also be boiled to make a well-flavored drink similar to coffee, hence the name coffeeberry. It is an important browse plant in California and Arizona, the foliage and young twigs being relished by cattle, goats, and deer, hence the name goatnut.

Indians of Baja California highly prized the fruit for food and the oil as a medicine for cancer and kidney disorders. Indians in Mexico use the oil as a hair restorer. Reported to be emetic, jojoba is a folk remedy for cancer, colds, dysuria, eyes, head, obesity, parturition, poison ivy, sores, sore throat, warts, and wounds. Seri Indians applied jojoba to head sores and aching eyes. They drank jojoba-ade for colds and to facilitate parturition.^{32,63}

I was amazed, in searching through files on jojoba, to find no conventional proximate analysis. It was not even included in two of my most treasured resources, *Hager's Handbook*³³ and the *Wealth of India*.¹ Perhaps this is due to the relative novelty of interest and the unique situation that the seed contains liquid wax rather than oil, sort of unusual for the conventional analyses. Verbiscar and Banigan²⁹⁵ approximated a proximate analysis, some of which follows: per 100 g, the seed is reported to contain 4.3 to 4.6 g H₂O, 14.9 to 15.1 g protein, 50.2 to 53.8 g fat, 24.6 to 29.1 g total carbohydrate, 3.5 to 4.2 g fiber, and 1.4 to 1.6 g ash. USDA analyses show 15.6% protein and 45.6% fat.²¹ The amino acid composition of deoiled jojoba seed meal is 1.05 to 1.11% lysine, 0.49% histidine, 1.6 to 1.8% arginine, 2.2 to 3.1% aspartic acid, 1.1 to 1.2% threonine, 1.0 to 1.1% serine, 2.4 to 2.8% glutamic acid, 1.0 to 1.1% proline, 1.4 to 1.5% glycine, 0.8 to 1.0% alanine, 1.1 to 1.2% valine, 0.2% methionine, 0.8 to 0.9% isoleucine, 1.5 to 1.6% leucine, 1.0% tyrosine, 0.9 to 1.1% phenylalanine, 0.5 to 0.8% cystine and cysteine, and 0.5 to 0.6% tryptophane. Detailed analyses of the wax esters, free alcohols, and free acids are reported in NAS.²⁹⁷ Per 100 g jojoba meal, there is 1.4 g lysine, 0.6 g histidine, 1.9 g arginine, 2.6 g aspartic acid, 1.3 g threonine, 1.3 g serine, 3.2 g glutamic acid, 1.5 g proline, 2.4 g glycine, 1.1 g alanine, 0.6 g cystine, 1.5 g valine, 0.1 g methionine, 0.9 g isoleucine, 1.8 g leucine, 1.1 g tyrosine, and 1.2 g phenylalanine. The two major flavonoid constituents of the leaves are isorhamnetin 3-rutinoside (narcissin) and isorhamnetin 3,7-dirhamnoside. Seed meals (27% protein, 12% fiber, 3.9% ash, and 3.3 kcal/kg) from seven locations averaged 6610 µg/g K, 136 Na, 1410 Mg, 372 Ca, 46 Fe, 21 Mn, 16 Zn, 10 Cu, 3.8 Ni, and 0.7 µg/g Co.²⁹⁹

Toxicity — The acute oral LD₅₀ for crude johoba oil to male albino rats is higher than 21.5 ml/kg body weight. Strains of *Lactobacillus acidophilus* can ameliorate this toxicity. Rats injected with jojoba oil were similar to controls injected with olive oil. Guinea pigs treated topically with refined jojoba wax for prolonged periods show normal growth and no histopathological changes in the internal organs. Seeds contain 2.25 to 2.34%; seed hulls, 0.19%; core wood, 0.45%; leaves, 0.19 to 0.23%; twigs, 0.63 to 0.75%, and inflorescence, 0.22%; simmondsin is a demonstrated, appetite-depressant toxicant. Three related cyanomethylenecyclohexyl glucosides have also been isolated from the seed meal. Swingle²⁹⁹ found problems using jojoba meal as a protein source in livestock feed. Feeder steers ate significantly less feed when it was supplemented with 10% untreated jojoba meal as compared to cottonseed meal. They were not so quick to digest feed and gain weight.