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Phytolacca americana L. (American pokeweed) is an invasive plant in many European countries. However, the plant has potential as a medicinal, phytoremediation plant, and as a rich source of antioxidants and natural dyes. The purpose of this book is to help the reader to better understand the potential for beneficial use of secondary metabolites of P. americana plants, especially for the obtaining and using of the natural red dye betacyanin. The morphobiological features of American pokeweed plants growing in the Republic of Moldova and the Slovak Republic are compared. The phenolic composition determined in different parts of the plant, their antioxidant activity and the developed procedure for obtaining pure natural dye and dye-polysaccharide compositions in the form of powder are described. The effect of activated water of varying degrees of activation on the extraction of biologically active substances from berries and the antioxidant activity of these extracts is shown. A scheme of technological stages for obtaining a natural dye from American pokeweed berries containing betacyanin in pure form and in combination with carboxymethylcellulose (CMC) or rice flour is proposed, and their thermal stability and shelf life are studied. Coating corn seeds with the obtained CMC-colorant composition allows us to draw a conclusion about the growthregulating capacity of this composition. The role of entropy in assessing the thermodynamic state of American pokeweed is discussed.