The study of volatile compounds responsible for fruit aroma is important for the characterization and formulation of aromas. Assai (*Euterpe oleracea* Mart.) and cupuassu (*Theobroma grandiflorum* Schum.) fruits are native to the Amazon region. Noni (*Morinda citrifolia* Linn.) is a tropical plant grown in the Pacific Islands and has been used as a folk medicine to cure certain diseases. The aim of this study was to determine the physico-chemical and chemical characteristics as well as to identify the volatile compounds by the techniques of Solid Phase Microextraction (SPME) in assai, cupuassu and noni pulps. The assai pulp had its acidity (0.19 to 0.23%), soluble solids (3.30 to 3.46°Brix), pH (4.86 to 5.02), total sugars (3.10 to 3.57%), and total phenolic compounds (106.87 to 110.83mg/100g). The cupuassu pulp had its acidity (1.68 to 2.06%), soluble solids (11.06 to 12.83°Brix), the pH value (3.05 to 3.38), total sugars (6.66 to 7.59%) and total phenolic compounds (88.24 to 98.00mg/100g). The noni pulp had its acidity (0.74 to 0.85%), soluble solids (12.16 to 12.63°Brix), the pH value (3.85 to 3.91), total sugars (5.76 to 5.94%) and total phenolic compounds (112.02 to 117.12mg/100g). In SPME of volatile extracts obtained from assai pulp, the prominent volatile compounds were hexanal, (Z)-3-hexenol, (Z)-3-hexanol, benzaldehyde, linalool, 2-methyl-but-3-en-1-ol, 3-methyl-3-butenol. In SPME of cupuassu pulp, the major compounds were ethyl butanoate, linalool, ethyl hexanoate, 2,4,5-trimethyl-1,3-dioxolane-trans, 2,4,5-trimethyl-1,3-dioxolane, 3-hydroxy-ethyl-butanolate and 2-propenyl-butanolate. In SPME of noni pulp, the major compounds were 2-propenyl-octanoate, ethyl hexanoate, 2-methyl-3-methyl-2-butenyl propanoate, 2-heptanone, 3-methyl-2-buten-1-yl isobutanoate, 2-methylpropyl hexanoate and dimethyl thiosulfide.