the levels of activity of the nervous system is related to the activity of the enzyme[10]. The enzyme activity is related to the amount of Ach synthesized and released. Since the electrical activity of the cardiac ganglion shows variations it is reasonable to expect changes in the AChE activity also. High level of activity necessitates the availability of energy in larger amounts which steps up the oxidative pathways. Besides, high levels of Ach, leading to increased AChE activity, it also stimulates the cellular respiration leading to release of higher amounts of energy[15]. Thus the variations in the heart beat at different regions seem to be due to the acetylcholine synthetic and energy yielding processes leading to variations in the electrical activity of the cardiac ganglion.

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CHEMICAL COMPONENTS OF *EUGENIA JAMBOLANA* STEM BARK

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EUGENIA JAMBOLANA (Syn. *Syzygium cumini*) belongs to the family Myrtaceae and the common Indian name is 'Jamun'. The stem bark was examined by Sengupta and Das[1] who isolated betulinic acid, friedelin, epi-friedelanol, β-sitosterol and eugenin, a fatty acid ester of epi-friedelanol. However the name eugenin for the ester was not appropriate since it had already been used long ago for 2-methyl-5-hydroxy-7-methoxy chromone which was isolated from *Eugenia caryophyllata*[2,3]. The bark is astringent and is used in sore throat, bronchitis, asthma and dysentery; therefore in order to study its phenolic constituents, the stem bark (400 gm) was cut into coarse powder and extracted with petroleum ether and alcohol. Identification of compounds was confirmed whenever possible by direct comcarison with authentic samples using mixed m.p. and I.R. spectra.

The petroleum ether extract yielded a brown oil (15 g) which was subjected to column chromatography over silica gel using petroleum ether-benzene as eluants and 4 compounds A, B, C, D were obtained. Compound A (500 mg), crystallised from chloroform-methanol as colourless needles, m.p. 309 311°, $[\alpha]_D$ +7° ($CHCl_3$) and was identified as betulinic acid. Compound B, after crystallisation from $CHCl_3$–MeOH (350 mg) as needles had m.p. 255–56° $[\alpha]_D$ −20° ($CHCl_3$). It gave positive Lieberimann-Burchard test. It was identified as friedelin. Compound C (50 mg) crystallised from $CHCl_3$–MeOH as needles, m.p. 295–300°, $[\alpha]_D$ + 14° ($CHCl_3$). Its identity as friedelan-3 α-ol was confirmed by comparison with an authentic sample, and by the preparation of its acetate. Compound D, crystallised from methanol as colourless needles (70 mg), m.p. 135–36°, $[\alpha]_D$ −30·6° and it was identified as β-sitosterol.

Alcohol extract.—From the alcohol extract, was obtained ethyl acetate soluble and ethyl acetate insoluble fractions. The former was concentrated to a syrup which was a mixture of three compounds (TLC). They were separated by column chromatography over silica gel using ethylacetate and different proportions of ethyl alcohol as eluates to yield E, F and G. Compound E (200 mg), crystallised from aqueous ethanol and had m.p. 177–179°. It gave a brown colour with alcoholic ferric chloride and deep red colour with magnesium and

hydrochloric acid. λ_{max}^{MeOH} : 264, 367 nm. It formed an acetate by the pyridine-acetic anhydride method and crystallised from ethyl acetate as needles, m.p. 186–187°. The compound was identified as kaempferol by comparison of itself and of its acetate with authentic kaempferol and its tetra-acetate respectively. Compound F crystallised from alcohol, m.p. 315–317°, λ_{max}^{MeOH}, 255, 302, 317 nm. It formed an acetate with pyridine/acetic anhydride, m.p. 199–200°. The compound F was identified as quercetin. Compound G (70 mg), crystallised from pyridine-alcohol. It gave positive LB test. when hydrolysed with 7% aq. methanolic (50/50 v/v) sulphuric acid, it gave β-sitosterol as the aglycone and D-glucose as the sugar part. It gave an acetate, m.p. 166–167°, $[\alpha]_D$ —40° ($CHCl_3$). The parent compound and its acetate were identical in all respects with authentic samples of β-sitosterol-β-D-glucoside and its acetate respectively.

The ethyl acetate insoluble fractions yielded two compounds H and I separated by preparative chromatography (TLC). Compound H (20 mg) crystallised from ethanol as pale yellow prisms, m.p. 176–179°. It gave brownish green ferric chloride reaction and deep red colour with magnesium-hydrochloric acid. On acid hydrolysis it gave kaempferol as the aglycone. The aq. solution contained D-glucose. The glycoside gave the following UV data : λ_{max}^{MeOH} 265, 350 nm, + NaOAc 272, 302, 375 nm, + NaOAc + H_3BO_3 265, 302, 375 nm, + $AlCl_3$ 273, 302, 393 nm. It was identical with kaempferol-3-O-glucoside. The compound I (15 mg) was identified as sucrose.

A small portion of alcoholic extract was directly hydrolysed with 10% sulphuric acid and the hydroxylate was extracted with ethyl acetate. The ethyl acetate solution was found to be mixture of β-sitosterol, kaempferol, quercetin, gallic acid and ellagic acid. The last two showed the presence of gallo- and ellagi-tannins in the alcohol extract as major components. Boiling the alcohol extract with HCl did not produce any appreciable red colour indicating absence of proanthocyanidin.

Thus the present investigation on the stem bark of *E. jambolana* has revealed the presence of β-sitosterol-D-glucoside, kaempferol-3-O-glucoside, kaempferol and quercetin which were not noted before. Gallo- and ellagi-tannins which are present in the alcohol extract may be responsible for the astringent property of the stem bark.

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