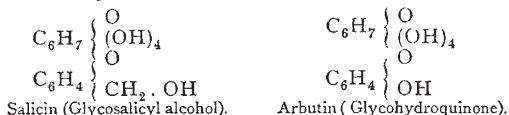


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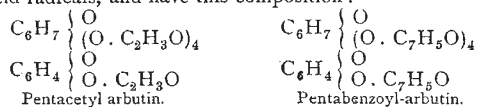
Constitution of Arbutin

HUGO SCHIFF has made some interesting experiments relating to the constitution of arbutin. This substance splits up into glucose and hydroquinone, just as salicin is resolvable into glucose and saligenin (Strecker). The relations between salicin and arbutin may be represented by the following formula:



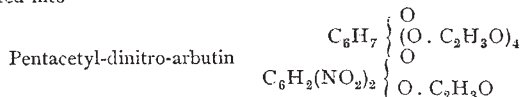
The hydrogen in the oxyhydrils of the glucosidic portion of arbutin may in fact be replaced by acid radicals, just as the author formerly showed in the case of salicin (Zeitschr. (2), v. 1. 52). Moreover, the hydrogen belonging to the hydroquinone in arbutin is easily replaceable; whereas in salicin the hydrogen belonging to the saligenin is not capable of substitution.

Benzoyl-arbutins are obtained by means of benzoyl chloride; acetyl-arbutins, with acetyl chloride or acetyl oxide, which act at 60°-80°. The ultimate products of the reaction separated from the resulting solutions, after cooling, by means of ether, contain five acid radicals, and have this composition:



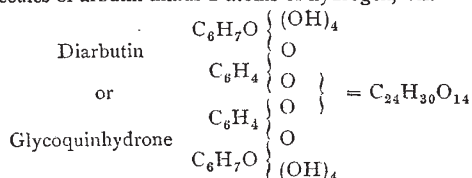
They are colourless bodies, insoluble in water, slightly soluble in ether, more soluble in hot alcohol, from whence they crystallise on cooling in small shining needles. The acid radicals may easily be taken out again by boiling with weak bases. Together with the pentabenzoylated compound, the author likewise obtained dibenzoyl-arbutin, in which the hydrogen might be further replaced by acetyl.

Dinitro-arbutin dissolves easily in acetic oxide, and is converted into



which may be separated from the acetic acid solution by water, and crystallised from hot alcohol in fine needles, insoluble in water, slightly soluble in ether. The alcoholic solution heated with sulphuric acid yields glucose, acetic ether, and dinitrohydroquinone, easily recognisable by the splendid colour which it gives with caustic alkalis. Dinitro-arbutin forms with basic lead acetate a crystalline orange-coloured lead-compound, in which the hydrogen of the oxyhydril is replaced by lead. Arbutin gives no precipitate, even with an ammoniacal solution of lead-acetate.

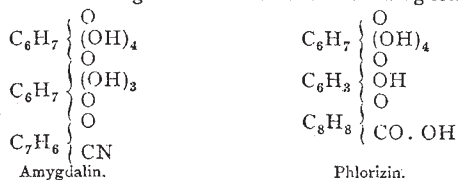
Recently precipitated silver-oxide is reduced, even at ordinary temperatures, by an aqueous solution of arbutin. On adding freshly prepared silver carbonate to a solution of arbutin heated to 50°-60° as long as carbonic acid is evolved, and heating for a short time with excess of the silver carbonate, a yellow solution is obtained, which no longer contains arbutin; but on separating the dissolved silver with a few drops of hydrochloric acid, and filtering, a solution is obtained, from which alcohol precipitates white flocks consisting of a compound formed by the union of 2 molecules of arbutin minus 2 atoms of hydrogen, viz.—



This compound may be regarded as the glucoside of quinhydrone (green hydroquinone); it is related to arbutin in the same manner as helicoidin to salicin. Glycoquinhydrone is not at all bitter; it forms acetyl-derivatives when treated with acetic oxide, and an orange-coloured nitro-product with nitric acid. The latter, when decomposed in alcoholic solution by sulphuric acid, does not yield any substance that turns violet with potash. By means of zinc and sulphuric acid, hydrogen may be again added; and dinitro-hydroquinone thereby produced.

A solution of arbutin produces with ferric chloride a deep blue colour, which gradually disappears. None of the derivatives of arbutin above described exhibit this reaction.

Schiff also finds that amygdalin contains seven, and phlorizin five oxyhydril atoms, the hydrogen of which may be replaced by acetyl. Hence he assigns to these bodies the following formulae:



(Zeitschr. f. Chem. (2) v. 519. Ann. Chem. et. Pharm. cliv. 237.)

SCIENTIFIC SERIALS

Poggendorff's *Annalen*, 1870, No. 7. The contents of this Number are:—(1.) "On the effect of Roughness of Surface on the Radiation of Heat," by G. Magnus. The author shows that the generally accepted explanation of the increased emission of radiant Heat by roughened surfaces, that it depends on a diminution of superficial density, is inadmissible. He attributes it to the refraction which takes place at the surface of emission, whereby the direction of the rays which leave the surface obliquely is changed. (2.) "On the Specific Gravity of Alcohol and of Mixtures of Alcohol and Water," by E. H. Baumbauer. A defence of the author's tables of the specific gravity of alcohol against Mendelejeff's criticisms contained in Poggendorff's *Annalen* for 1869, vol. 138. (3.) "On the Flow of Mercury through Capillary Tubes," by E. Warburg. The author's experiments prove that in glass tubes, whose diameter is a sufficiently small fraction of their length, the quantity of mercury which flows through them in a given time is directly proportional to the difference of pressure at the two ends, to the fourth power of the diameter, and inversely proportional to the length, but that it is independent of the absolute pressures at the ends so long as the difference remains constant. He concludes from these results that there is no friction, under the conditions of the experiments, between the mercury and the glass, but that the film of mercury in contact with the glass remains at rest while the inner portions flow through it. (4.) "Continuation of Investigations into the Electromotive Force between Liquids," by J. W. Müller. (5.) "On the Determination of the Proportion of Water in Glacial Acetic Acid," by F. Rüdorff. The author gives a table for deducing the proportion of water contained in acetic acid from the freezing point of the mixture. He gives 16.7° C. as the freezing point of pure acetic acid (without water), and finds that the presence of ½ per cent. of water lowers the freezing point by more than a degree. (6.) "On the Determination of the Freezing and Melting Points of Fats and other Compounds," by F. Rüdorff. The author points out the untrustworthiness of observations of melting points made, as they often are, by heating the substance to be examined in a capillary tube, or by coating the bulb of the thermometer with it. He recommends the observation of the freezing point, with a thermometer whose bulb is actually immersed in the substance, as a means of establishing its chemical identity instead of observing the melting point. To ascertain whether the observed temperature is the highest at which solidification can occur, he notices whether it is accompanied by rise of temperature, which always takes place if the body has been cooled below the normal freezing point. (7.) "On the Phosphorescence of Rarefied Gases after the passage of an Electric Discharge," by E. Sarasin. The author finds that the presence of oxygen, either free, or combined in a compound which is probably decomposed by the discharge, is an essential condition of the occurrence of the phosphorescence, and shows that this phenomenon is probably connected with the formation of ozone. Sulphuric acid vapour favours the production of phosphorescence in a high degree. (8.) "On the Electromotive Forces due to the contact of different metals," by E. Edlund. When an electric current traverses the point of junction of two different metals, a quantity of heat is absorbed or produced per unit of time which is proportional to the strength of the current and to the electromotive force acting between the metals. The author refers on this point to a previous paper (Poggendorff's *Annalen*, vol. cxxxvii.); in the present communication he endeavours to estimate the comparative electromotive forces acting between different pairs of