

## NICOTINE: WASTE PRODUCT OR PLANT FOOD?

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The role of alkaloids, of which class of substance plants produce many kinds, is still an unsolved problem of plant physiology. Many of the alkaloids are highly poisonous substances and hence it is not surprising that the view is often expressed that they serve a protective purpose, defending the plant which makes them from attack by animals to which the alkaloids are toxic. The direct evidence in support of this view is, it must be confessed, somewhat meagre. It is, of course, easy to imagine that the plant which has contracted the habit of manufacturing alkaloids should come to possess a high degree of tolerance towards the poison. This biological method of defence against attack by animals would, moreover seem to be practised very generally by plants. Yeast, for example, when growing in the absence of oxygen—that is, in conditions where it is likely to encounter severe competition from other micro-organisms—can go on piling up alcohol till the medium in which it is growing contains some 17%, a concentration which is apt to prove "too much of a good thing" to its rivals. Although however, the protective function of alkaloids is a plausible enough hypothesis, when put to the test of experiment it would seem to break down. For example, Messrs. Theron and Cutter, of the School of Agriculture, Potchefstroom\* have brought forward experimental evidence which shows that the protective power of nicotine is not sufficient to save the Tobacco plant from attack by various pests—eelworm, aphides and bacteria. Having been compelled as a result of their observations to regard the prevalent theory with suspicion, they, very properly, set about an inquiry into the actual part which nicotine does play in the economy of the plant. They find that as the Tobacco plant grows so its nicotine content steadily increases and that the increase goes on up to the flowering stage. When that stage is reached, however, the nicotine contained in the plant tissues undergoes a rapid decrease and with seed formation there is still further decrease in the amount of nicotine. The actual quantity contained in the plant is not unnaturally influenced by the vigour of growth, which, in turn, is favourably affected by the addition of phosphatic and potassic as well as nitrogenous fertilizers. From these facts the authors reach the conclusion that nicotine serves the Tobacco plant as a store of nitrogenous food. Presumably the nicotine is decomposed by the plant as it passes into the flowering stage and the nitrogen which it contains is incorporated in the living tissues. These observations, on which this hypothesis is based, lead in any case to conclusions of practical importance. When grown for nicotine extraction the Tobacco plant should be harvested before it has begun to dissipate its stores of the alkaloid; but when grown for Tobacco the plant should be encouraged to get rid of the excess of this product so that the leaves shall contain the right and small amount of the drug which apparently both gives the maximum of pleasure to the smoker and inflicts on him the minimum harm.—Gardeners' Chronicle, Vol. LXXVIII, No. 2029

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\* *South African Journal of Science*, XXI., p. 189, 1924.