THE abortion of ovules in peanut fruit is largely responsible for the failure to attain the maximum productive capacity of a peanut plant. Even under soil conditions where high yields were obtained, it has been found that not more than three-fourths of the fruits contained two well developed ovules (3). Yields of Virginia-type peanuts as high as 1,603 pounds per acre have been obtained even though abortion occurred in 61.1% of the ovarian cavities (3). Thus, information on the factors affecting ovule abortion as well as the physiological processes which take place when peanut fruit develop are seen to be of utmost importance.

In previous investigations, Colwell and Brady (1, 3) found that nutrient supply was one of the factors affecting ovule development. Under conditions of high calcium supply abortions occurred less frequently, whereas additions of potassium and magnesium slightly decreased kernel development. Although none of the nutrient combinations employed were effective in producing only well filled fruit, it is evident that the failure of kernels to develop was at least in part a nutritional problem in which calcium played a vital role. Thus, it would seem that information on the chemical composition of the peanut fruit would be valuable in determining the mechanism whereby nutrient supply influences kernel development.

In the present study, particular attention was given to the peanut shell since previous work had shown the composition of this plant part to be more sensitive to nutrient supply than that of the kernel. Determinations were made for total nitrogen, potassium, magnesium, and calcium. In an attempt to associate chemical composition more directly with ovule abortion, separate analyses were made on shells of filled and unfilled fruit.

The experimental material on which analyses were run was obtained from field experiments in which fertilizer treatments had exerted pronounced effects on ovule development. Thus, it was possible to determine the effect of treatment on the composition of shells of filled and unfilled fruit, and to interpret these results in the light of the quality of fruit resulting from these same treatments.

MATERIALS AND METHODS

At the time of digging, fruits from 10 to 20 plants were detached from the vines, brought to the laboratory, and, after drying, were classified on the basis of kernel development. The classification procedure was used in determining the effect of treatment on fruit quality and has been described in detail elsewhere (3). To