non-enzymic factor may also be playing some role in rapidly killing the host tissue especially before the pH drifts to alkalinity. In other words, the 'Killing factor might be playing a role in the initial stages (pH is around 5·0) while the endo-PGTE could assume importance both at the initial stages and to an increased extent at subsequent invasion by the fungus (when the pH increases to 8·5).

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PHENOLIC ACIDS OF VIABLE AND NON-VIABLE SEEDS OF GROUNDNUT (*ARACHIS HYPOGAEA*, L.)

THE various factors involving the loss of seed viability were discussed by Roberts[1] and various physiological and biochemical changes associated with seed deterioration were reviewed by Abdul Baki and Anderson[2]. Dey *et al.*[3] reported that there was an accumulation of certain phenolic acids like coumarin, ferulic and sinapic acids in the non-viable seeds of rice. The present paper reports investigation on qualitative and quantitative aspects of phenolic acids in viable and non-viable goundnut seeds.

Four months old (viable) and three year old (non-viable) seeds of groundnut variety TMV-3 were used for qualitative and quantitative determination of individual phenolic acids. The viability of seeds was tested with tetrazolium chloride and by the normal germination test.

Phenolic acids were extracted from both viable and non-viable seeds by the method of Bate-Smith[4]. Two dimensional paper chromatography was carried out to detect the individual phenolic acids as per the technique of Ibrahim and Towers[5]. The individual phenolic acids from the paper were eluted with 95% ethanol and co-chromatographed with authentic samples. The phenolic acid content was estimated with Folin's reagent.

Six monohydroxy phenolic acids (α-resorcylic, *p*-hydroxybenzoic, *trans-p*-coumaric, *cis-p*-coumaric, phloretic and vanillic acids) and two dihydroxy phenolic acids (protocatechuic and chlorogenic acids) were present in the viable seeds. In non-viable seeds the number of monohydroxy and dihydroxy phenolic acids remains the same as viable seeds except protocatechic acid. However, more amounts of monohydroxy phenolic acids were present in the viable seeds when compared to non-viable seeds. The content of dihydroxy phenolic acids decreased to half of their amounts in the non-viable seeds. Thus, the total disappearance of photocatechuic acid and decreased levels of all the individual phenolic acids in the non-viable seeds may be suggestive of their primary role similar to essential metabolite levels like carbohydrates, fats and proteins which were shown to decrease in non-viable seeds when compared to viable seeds[1]. It has been shown that large amounts of inhibitors like abscisic acid accumulate in non-viable seeds of groundnut[6]. Therefore, it is quite probable that the phenolic inhibitors do not play an active role in the loss of viability of groundnut seeds.

TABLE I
Phenolic acids of viable and non-viable groundnut seeds μg/gm dry seed

	viable	non-viable
1. Chlorogenic acid	44·55	20·20
2. Protocatechuc acid	9·27	..
3. *Trans-p*-coumaric acid	7·69	2·36
4. *p*-Hydroxy benzoic acid	12·15	3·23
5. α-Resorcylic acid	16·20	4·01
6. *cis-p*-coumaric acid	10·07	4·81
7. Phloretic acid	6·68	1·80
8. Vanillic acid	5·47	4·61
Total	110·08	41·02

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