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**Agricultural Experiment Station**  
Kansas State Agricultural College.

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## **Prevention of Sorghum and Kafir-corn Smut.**

The most common smut of the cultivated sorghums is what is known as "grain smut," caused by a fungus allied to the smut of corn, and which grows entirely within the tissues of the plant, becoming externally evident and most active in the flowering head, where it consumes the food material intended for seed formation. At maturity the affected heads considerably resemble normal heads in appearance, but in the interior the seed kernels are almost entirely replaced by a mass of olive-brown, dusty "spores," the reproductive bodies of the fungus. These spores germinate when the seeds are planted, sending forth slender germ tubes, which infect the young germinating grain by growing into the delicate tissues. Within the host plant, the fungus consists of very minute, slender threads, the mycelium, which penetrate all the soft parts of the growing stem. The results of the activity of the fungus do not become manifest until the head appears. The injury done lies in the destruction of the developing seed, and (in sorghum) in the reduction of the sugar content of the stalk. The Jensen hot-water treatment of the seed has been found effective, but it is cumbersome and inconvenient of application.

Experiments this season, conducted by the Botanical Department of the Experiment Station, indicate that formaldehyde is an effective means of prevention when the smutted seed is soaked for twelve hours in a solution of one-fifth of one per cent of formaldehyde in water (one pint of formaldehyde to sixty-two gallons, three pints of water), or for two hours in a solution of one-half of one per cent of formaldehyde in water (two pints of formaldehyde to forty-nine gallons, three quarts of water).

The check plots in this experiment yielded 33.4 per cent and 27.8 per cent of smutted stalks, respectively, as against none at all for the same seed treated with the percentages of formaldehyde mentioned. On account of the lesser time required for soaking,

the second or stronger solution is recommended. After soaking, the seed should be spread out upon a clean floor and turned occasionally until dry.

Commercial formaldehyde is formaldehyde gas held in water to saturation. Such a solution has a maximum strength of 40 per cent. The percentage solutions recommended in this bulletin are percentages of the 40 per cent solution.

In treating the smutted seed, allow three pints of the formaldehyde solution as made up, to cover four and one-half pounds of the seed, or about four and one-half gallons to the bushel of seed. The same liquid may be used over and over again, so long as the seed is kept covered. The most satisfactory method of procedure is to hang the smutted seed, enclosed in a loose burlap bag, within a barrel into which the formaldehyde solution has previously been poured. Cover top of barrel to retain the fumes of escaping formaldehyde gas as much as possible.

Forty per cent formaldehyde is a liquid retailing at thirty-five cents per pound (pint). The cost of the treatment by using the one-half of one per cent solution would be about six cents per bushel of seed for the formaldehyde used. H. F. ROBERTS.

Manhattan, Kan., April 2, 1907.