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SUMMARY

Yellow corn grains are susceptible to several fungal pathogens such as *Fusarium*, *Aspergillus*, *Acremonium* and *Penicillium*. Some of these fungi are able to produce one or more health hazard mycotoxins. This work aimed at investigating the effect of storage conditions, namely; temperature, moisture, storage period or combinations and percentage of broken grains on mycotoxin's production.

The obtained results could be summarized as follows:

- 1-The fungi associated with imported yellow corn grains, included: *Aspergillus flavus*, link; *Aspergillus wentii* Whem; *Aspergillus niger* vantighem; *Penicillium rubrum* Stoll, *Fusarium sacchari* (Butl) W. Gams; *Fusarium verticilloides* (Sacc) Nirenberg; *Acremonium strictum* W. Gams and two isolates of *Alternaria* sp. and *Mucor* sp. and one isolates of *Rizoctonia* sp. and *Saccharomyces* spp.
- 2-The frequency of the isolated fungi on Potato Dextrose Agar and Sabraud Media incubated at different temperatures ranged from 4°C to 40°C was calculated. *Fusarium* spp; *Acremonium* sp; and *Aspergillus flavus* were the most prevalent fungi on PDA at 25°C. The frequency of *F. sacchari*, *F. verticilloides* and *A. strictum* was 29.7%, 25.1% and 17.9%, respectively. Whereas, it was 10.6% and 61.46% for *Aspergillus flavus* at 25°C and 40°C, respectively. Furthermore; *A. strictum* could only be isolated on sabouraud medium at 25°C with a frequency reached 26.14% while the frequency for *A. flavus* was 45.45% and 60.41% at at 25°C and 40°C, respectively. Also, the frequency of *A. wentii* was 28.41% and 13.29% at 25°C and 40°C, respectively.

- 3- The ability of *A. flavus* and *A. wentii* isolates to produce Aflatoxins on different media (PDA, YES and corn grain) was tested using a Fluorometer apparatus and Plug Agar Method. Results indicated that tested isolates of both species of *Aspergilli* were not able to produce Aflatoxins on the tested media.
- 4- The ability of *F. sacchari*, *F. verticilloides* and *A. strictum* to produce Fumonisin(s) was tested by growing each tested fungus on liquid media and on yellow corn grains medium. There were a great variations between the Fumonisins, amounts produced in both used media (Bottalico's medium) and yellow corn grains. *F. sacchari*, produced 0.98 ppm and 77 ppm followed by *F. verticilloides* which produced 0.67 ppm and 62.5 ppm and *A. strictum* produced 0.54 ppm and 56 ppm in the liquid medium and yellow corn grains, respectively. As far as the available literature is concerned, this is the first report of Fumonisins production by *A. strictum*.
- 5- The ability of tested *Fusarium sacchari* and *F. verticilloides* to produce Zearalenone was also proved. Both fungi were able to produce Zearalenone at a concentration of 0.11 ppm in case of *Fusarium sacchari* and 0.13 ppm in case of *F. verticilloides*.
- 6- The effect of storage temperature, i.e., 20°C, 25°C and 30°C during 4, 8 and 12 weeks on Fumonisins production was tested. At 25°C, *F. sacchari* produced the highest amount of Fumonisins (44500 ppb) after 8 weeks of storage.
- 7- The effect of moisture content, i.e., 14%, 16% and 18% during the tested storage periods at 20°C on Fumonisins production was determined. Fumonisins production increased in proportion to

moisture content, up to 18% after 12 week for *F. sacchari* and at 16% after 12 week in case of *F. verticilloides*.

- 8- The effect of interaction between storage temperatures (25°C and 30°C) and moisture content (16% and 18%) on Fumonisin production during three storage period (4, 8 and 12 weeks) was tested. The highest amounts of Fumonisin(s) was obtained at 16% moisture content and 30°C temperature for *F. sacchari* after 8 weeks and whereas it was produced after 12 weeks for *F. verticilloides*. *A. strictum*, however, produce its highest Fumonisin(s) amount at 18% moisture content and 30°C after the 8 week.
- 9- The effect of broken grain percentage in relation to Fumonisin(s) production showed that Fumonisin(s) production was in proportion to the increase in the percentage of broken Kernel.
- 10- The effect of moisture content levels 14%, 16% and 18% on Zearalenone produced by the tested *Fusaria* showed that at 16% moisture content, *F. sacchari* and *F. verticilloides* produced the highest amount of Zearalenone followed by 14% while at 18% the amount of Zearalenone produced was the lowest. Data obtained during the course of this study indicated that the tested *Fusaria* were able to produce more than one mycotoxins in imported corn grains such as Fumonisin(s) and Zearalenone. Such mycotoxins should therefore, be included in the certification of imported grains, beside Aflatoxins in order to eliminate the possibility of introducing any health hazards materials to human or animals to Egypt.