

ABSTRACT

The antioxidative activity of the essential oils of the species: *Apium graveolens*, *Ferula ovina* Boiss, *Foeniculum vulgare* Miller and *Trachyspermum ammi* (L) Sprague of the Umbelliferae family of Paksitan have been suited by accelerated oxidation and method (AOM) at varying concentrations and temperatures in Cottonseed oil. The antioxidative activity of the essential oils has been compared with standard antioxidant.

The species *Ferula ovina* have shown antioxidative activity better than the standard antioxidant. The species *Apium graveolens* with concentrations of 0.01% and 0.015% at temperatures 40 °C and 50 °C shoed antioxidative activity equal to that of BHT. The essential oils of the species *Foeniculum vulgare* and *Trachyspermum ammi* showed activity weaker than that of standard antioxidants under similar conditions of concentrations and temperatures. Statistical analysis was also carried out to study the effect of treatments on the storage time, temperature and concentrations. On application of LSD Range Test, it revealed that with the passage of time, the peroxide values of the oil increased significantly irrespective of temperature and concentration of the antioxidant. This is indicative of the fact that these essential oils do have antioxidation of the antioxidant. This is indicative of the fact that these essential oils do have antioxidative activity in accordance to the synthetic antioxidant BHT.

The effect of antioxidants and their concentrations on statistical analysis, the data showed a significant effect of treatments at 50°C and 60 °C but at 30 °C, the effect was non-significant. At 40 °C the effect was significant up to 4 hours but non-significant after 4 hours.

Statistical analysis of the effect of treatment and storage temperature on the peroxide values of the oil showed that the effect of treatment was non-significant in the presence of 0.02% and 0.025% antioxidant concentrations. In the presence of 0.01% antioxidant, the effect of the treatment was non-significant ($P > 0.05$) up to 6 hours, however, significant effect ($P < 0.05$) was observed at 8 hours. The effect of treatment at 0.015% concentration of the antioxidant was significant ($P < 0.05$).

The analysis showed the effect of temperature on the peroxide values significant in the presence of 0.01%, 0.015% and 0.25% antioxidant concentration whereas it was non-significant in the presence of 0.02% antioxidant. The data for the accelerated antioxidant method was also statistically analyzed. The analysis showed a significant effect of treatment on the peroxide values of the oil. The effect of storage time showed that the peroxide values of the oil increase significant ($P < 0.05$) at all the time intervals studied irrespective of the concentrations of the antioxidant. The effect of concentration showed that with any concentration of the antioxidant, the peroxide values were significant lower than that of with the blank.

Different bacterial and fungal cultures were used for the antibacterial and antifungal studies of essential oils. These cultures included bacterial strains such as i.e., *Streptococcus Thermophilus*, *Bacillus subtilis*, *E.coli* and *Salmonella* and the fungal strains *Aspergillus flavus*, *Aspergillus neger* and *Aspergillus oryzae*. It is concluded that essential oil of *Apium graveolens* and *Trachyspermum* has remarkable antibacterial and antifungal activity.