

Endosperm variation and fresh to dry weight ratio during *Trigonella persica* germination

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Trigonella persica Boiss. is an annual herbaceous plant of Fabaceae family, which is considered as one of the endemic species of Iran (legumes). This aromatic plant has cylindrical long stem (30-60 cm), pinkish color, shoulder leaves, three leaflets and triangular shapes stipule. Galactomannans are heterogeneous polysaccharides consisting of galactose and mannose subunits. In the family of legumes, galactomannans of the endospermic cell wall have a largely conserved role, and their abundance in the seed is such that in many species of this family, formed the main part of the grains dry weight Galactomannan in *Trigonella persica* Boiss. Seeds (as the major component of the cell wall) endosperm decreases with the advent of germination days. Endosperm plays an important role in absorbing water and preventing water stress in the germinating seed due to the presence of polysaccharides. In this research, with the aim of measuring the *T. persica* seeds galactomannan in the first three days of germination, the amount of dry and, fresh weight of endosperm in dry seeds (non-germinated seeds) and germinating seed at 24.48.72 after the imbibition was investigated. According to the results, the endosperm of seed germinating at 48 hours (after imbibition) had the heist dry weight and due to the presence of galactomannans, the fresh to dry weight ratio of the endosperm in 48 hours after imbibition was the highest. Also, radicle fresh to dry weight ratio along with growth (in during germination) increased but cotyledons weight variation in during germination there is no significant relationship between fresh to dry weight ratio.

Keywords: *T. persica*, Galactomannan, Germination, Endosperm

Uptake and distribution of phenanthrene and pyrene in roots and shoots of maize (*Zea mays* L.)

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Polycyclic aromatic hydrocarbons (PAHs) as a byproduct of carbon-based fuel combustions and are an important group of pollutants with a wide distribution in the environment. PAHs are toxic for almost all organisms, and plants can uptake such compounds by roots and translocate to various aerial parts. Accordingly, the aim of this study was to investigate the uptake, translocation, and accumulation of pyrene and phenanthrene, as frequent PAHs in the environment, in maize plants using an experimental study under controlled conditions. Seeds were cultivated in perlite containing 25, 50, 75, and 100 ppm of phenanthrene and pyrene and their concentrations in the roots and shoots of the plants were measured by using High-Performance Liquid Chromatograph (HPLC) after 7, 14, and 21 days. The results have demonstrated that phenanthrene naturally existing in maize and its concentration in shoots and roots decreased over time. In contrast, pyrene concentration increased in the roots but reduced in the shoots. In addition, pyrene had higher uptake rate than that of phenanthrene by roots of maize. However, its translocation factor was lower than that of phenanthrene. According to these findings, phenanthrene could be metabolized in maize in both shoot and roots, but pyrene had more tendencies to be accumulated in roots.

Keywords: Maize, Phenanthrene, Pyrene, Uptake rate, Translocation