Changes of Proline Content in Leaves of Two Alfalfa Cultivars with Different Salt Tolerance Undersalt Stress

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Changes of proline content in leaves of two alfalfa cultivars with different salt tolerance under salt stress

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Key word: alfalfa, growth, proline, salt stress

Introduction Salinity is the major environmental factor that limit plant growth, productivity and distribution. Proline is generally regarded as a compatible solute involved in cellular osmotic adjustments, whose accumulation increases when plants are in drought and salt stressed conditions. However, Lutts et al (1996) concluded from their studies on rice that proline accumulation contributed little in cellular osmotic adjustments, and that it may have had other functionality not yet discovered in plants.

Materials and methods Seeds of two cultivars of alfalfa (*Medicago sativa* L.), cultivars Zhongmu No.1 and Defor were surface sterilized with 6% sodium hypochlorite solution for 5 min. They were then germinated in humid sand medium on plate in the dark at 25/20℃ of 8 h/16 h, and then four uniform seedlings per cultivar and treatment combination, as a unit, were fixed into the holes of quadrate foam and transplanted into plastic vessels. Every vessel contained 4.4 L of a standard nutrient solution. After 20 days, 6 plants of each cultivar at each treatment were removed and divided into roots, shoots and leaves for the growth parameter and proline content (Tigen et al., 1973) measurements.

Results Root, shoot, and leaf growths (Figure 1) were inhibited by increased salt treatments in both cultivars, but Zhongmu No.1 had significantly higher root, shoot and leaf dry weights per plant than Defor. NaCl treatments led to a significant increase in the leves of proline content in both alfalfa cultivars (Figure 1). The proline accumulation in Defor (low salt tolerance), however, was much greater than in Zhongmu No.1 (high salt tolerance) at 140 and 210 mM salt treatments.

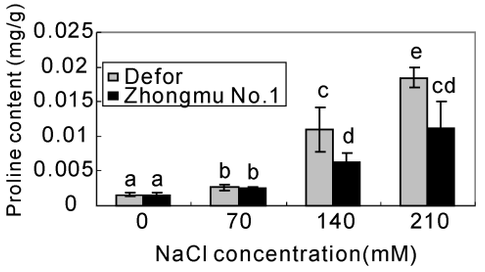

Figure 1 *Effect of NaCl on Proline of leaves of Defor and Zhongmu No.1 at 7 days after salt stress.*

Table 1 *Dry weight (mg / plant) of root, shoot and leaf of Zhongmu No.1 and Defor grown in four treatments after 15 days NaCl treatments.*

NaCl	Zhongmu No.1)				Defor			
	Control	70	140	210	Control	70	140	210
Root	0.035	0.032	0.028	0.023	0.033	0.024	0.019	0.014
Shoot	0.15	0.09	0.08	0.05	0.14	0.06	0.04	0.02
Leaf	0.13	0.11	0.10	0.07	0.12	0.07	0.06	0.03

Conclusions Under high salt treatments, Zhongmu No.1 exhibited better salt tolerance than Defor. Proline accumulation might result in higher salt tolerance instead of causing it. Also, this might indicate that proline was a contributing factor to the inhibited growth of plants under salt stress.

References

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