

### Abstract

The objective of this study was to study the association of candidate genes with (*FM*, *Id*, *PMEL17*, *MC1R* and *TYR*) with characteristics of black boned chicken. In 2015, the results showed the *FM* assay A, *FM* assay B and *Id542* markers could be classified the black boned with 88-95 % accuracy. The *Id542* marker had tended toward an association with the breast muscle color trait of black boned chickens ( $P=0.08$ ). No association of *FM* assay A and *FM* assay B markers with the breast muscle color of black boned chickens were observed. In 2016, the results showed the *PMEL17* and *MC1R-2* markers could be identified the black boned chicken with 72.84 and 82.02% accuracy, respectively. Moreover, the *MC1R-2* marker was significantly associated with breast muscle color trait of black boned chickens ( $P=0.0002$ ). The chickens with the E/E genotype had darker the breast muscular color values than those the chickens with the E/e genotype. In 2017, three polymorphisms of *MC1R* gene (*MC1R-69*, *MC1R-212*, *MC1R-636*) were tested in the black boned chickens, as well as single nucleotide polymorphism of *TRY* gene were analyzed within six PCR fragments (*TYR-1*, *TYR-2*, *TYR-3*, *TYR-4*, *TYR-5* and *TYR-6*). Two SNP markers of *MC1R-636* and *TYP-2* were found to be segregated in the black and non-black boned chickens. These two markers were used to genotyped in 60 black boned chickens and 50 non-black boned chickens (control group). The results showed that the molecular *MC1R-636* marker was significantly associated with characteristics of black boned chicken. The *MC1R-636* and *TYR-2* markers could be identified the black boned chicken with 83.74 and 68.83 % accuracy, respectively. Moreover, the *MC1R-636* marker was associated with the meat color of chicken meat. Expression levels of *MC1R* and *TYR* genes in the black boned chicken had significant higher than the non-black boned chickens about 1 and 1.38 folds, respectively. The results indicate that these genetic markers of *MC1R* and *TYR* are related to the black boned chicken characteristics.