This study aimed at investigating genetic diversity and qualitative variation within Syrian accessions of *Rosa damascena* in order to determine the best oil bearing one for commercial production. The experiments were conducted at Suleyman Demirel University in Turkey and Damascus University in Syria. Microsatellite technique was used to analyze the genetic diversity of seven accessions of *R. damascena* collected across major and minor rose oil production areas in Syria and one accession Control collected from Isparta province in Turkey. The microsatellite DNA allele counting-peak ratios method (MAC-PR) was used. The accessions were clustered using the un-weighted pair group method for arithmetic averages (UPGMA) by the statistical program marked as Popgene 1.31. Gas chromatography/mass spectrometry (GC/MS) Analysis of Rose oil distilled from each accession was used to compare oil quality within genotypes. The analysis results were statistically analyzed by the program marked as SPSS. Six different genotypes have been obtained from *Rosa damascena* accessions collected from Syria. Two accessions, Almahar1 and Bab Alnayrab, were identical to the Turkish gynotype. GC/MS analysis identified the main components of oil such as: Geraniol (28-31%), Citronellol (26-30%), Nerol (12-14%), Germacrene-D (6-8%), Nonadecane (4-6%) and Linalool (1-3%). In addition, many trace compounds were detected such as: Eicosane, Eugenol, Citral, Hexadecane and Rose oxide. This study showed for the first time the existence of genetic diversity within *Rosa damascena* cultivated in Syria. Almahar1 and Bab Alnayrab accessions are recommended to be used to broaden the production of rose oil.