

## Calculation method - O.D. value to Total pmol

### 1. Description of Values.

#### (1) O.D. value

Absorbance of UV260nm (A260nm). At the condition of 1mL water with total oligo DNA.

#### (2) [ nA, nC, nG, nT, nR, ... ,nN, nI ]

“A”, “C”, “G” and “T” are nucleotide base codes.

“R”-“N” are International Convention of Mixed bases (Degenerate bases).

“I” is International Convention of Inosine-base.

“N” is number of nucleic acid in one oligo DNA molecules.

#### (3) Explanation of number like 15.3

Absorbance index of each nucleic acid.

Commonly, it is written like 15,400[L·mole<sup>-1</sup>·cm<sup>-1</sup>].

As a matter of convenience, we write 1/1000 times value.

So that absorbance index unit is [L·mmole<sup>-1</sup>·cm<sup>-1</sup>]

### 2. Description of calculating formula

(1) O.D. (A260nm) is mean absorbance. Thus, the density of oligo DNA in the liquid solution is computed by division of absorbance index.

However, in the case of next formula, the unit of density is [mmole/L].

$$\text{(O.D.)[absolute number]} / \text{(absorbance index) [L·mmole}^{-1}\text{·cm}^{-1}] = \text{(density of oligo DNA) [mmole/L]}$$

(2) Answer of the calculation is amount of substance (pmole number), and it is total value of oligo DNA in the 1ml liquid solution. Density unit of (1) is [mmole/L],

Thus, we able to calculate amount of oligo DNA in the 1mL liquid solution dividing by 1000.

However, in the case of next formula, unit of amount is [mmole].

$$\text{(density of oligo DNA)[mmole/L]} / 1000 = \text{(amount of oligo DNA in the 1mL liquid solution)[mmole].}$$

(3) To fit the same unit level [pmole], substance value [pmole] is calculated by multiplying 10<sup>9</sup> (1,000,000,000) the amount value of (2).

(4) Summarized as fellow,

$$[\{(O.D.) / (\text{absorbance index}) / 1000\} \times 1,000,000,000 = \text{amount of substance [pmole]}$$

And so on.

$$\{(O.D.) \times 1,000,000\} / (\text{absorbance index}) = \text{amount of substance [pmole]}.$$

(5) Finally, Replacing (4) formula by the absorbance index of each nucleic acid and numbers.

$$\begin{aligned} & [\{(O.D.) \cdot (A_{260\text{nm}})\} \times 1,000,000 / \{(nA \times 15.4) + (nC \times 7.4) + (nG \times 11.5) + \\ & (nT \times 8.7) + (nR \times 13.4) + (nY \times 8.0) + nM \times 11.4\} + (nK \times 10.1) + (nS \times 9.4) + \\ & (nW \times 12.0) + nH \times 10.5] + (nB \times 9.2) + (vV \times 11.4) + (nD \times 11.8) + (nN \times 10.7) + (nI \times 7.2)\} \end{aligned}$$