OK, let's go with a simple example.

Let:
x=FINDGEN(4)
y=x^2

Your loop over INT_TABULATED will give the area under the curve for x=0->x[i]; this means

tab = FLTARR(4)
FOR i=1, 3 DO tab[i] = INT_TABULATED(x[0:i], y[0:i])

yields

print, tab
    0.00000   0.500000   2.75556   9.10000

You can check these aren't quite the correct answers, *for the integration*, given the (known) underlying function, but are fairly close. The discrepancy is caused by the rather coarse grid of dx=1.

For example, the integral of x^2 between 0 and 2 (i=2) is analytically 8/3=2.67. This method is off by about 5%.

The method of using the cumulative total is *not* the area under the curve, i.e., it's not integration. In this example,

tot = total(y, /cum)*(x[1]-x[0])
print, tot
    0.00000   1.00000   5.00000   14.0000

Clearly, this is not doing the same thing as integration. In this case, for i=2 you are finding the area of a rectangle 5 tics tall and 1 tics wide. This is not the same as the integration of x^2 between 0 and 2.

The underlying answer to your question is these two methods should not give the same answer - they are different operations.